THE

ECLECTIC REPERTORY

AND

ANALYTICAL REVIEW.

VOL. V. APRIL, 1815. No. II.

SELECTED PAPERS.

Observations upon the Ligature of Arteries, and the Causes of Secondary Hemorrhage; with a Suggestion of a New Method of employing the Ligature in Cases of Aneurism. By BENJAMIN TRAVERS, Esq. Demonstrator of Anatomy at Guy's Hospital. Surgeon to the Hon. East India Company, and to the London Infirmary for Diseases of the Eye.

[From the London Medico-Chirurgical Transactions for 1813.]

THE adhesive inflammation is the primary resource of nature under local injury. It is employed in doing the repairs of the fabric which the other modes of inflammatory action secretly undermine or openly destroy. Suppuration and ulceration are invariably actions of destruction, when uncontrolled by the process of adhesion. This fact is strikingly exemplified in abscesses of the viscera which open externally, and in sloughs of the intestine *per anum*, as I had lately occasion to show in detail.* The single tube of the intestine, after division

* See "An Inquiry into the Process of Nature in repairing Injuries of the Intestines, illustrating the treatment of penetrating wounds and strangulated Hernia." London, 1812.

or loss of substance, is united, and forms a perfect tube again; that of the artery is obliterated: for the faculty of adhesive inflammation, upon which both phenomena depend, resides in the opposite surfaces of these canals, and coagulable lymph, which coats over the tied bowel, seals up the tied artery.

Before this adhesive inflammation was understood, surgeons attributed its proper results to other causes. The obliteration of an artery, included in a ligature, was supposed to be caused by the coagulation of the blood in the vessel: and as the existence of a coagulum of blood depended upon the exclusion of a portion of it from the circulation, if the ligature was placed in the vicinity of a large branch, the coagulum was not formed, and hemorrhage was inevitable. This was the doctrine recently taught in our schools, and illustrated by preparations; which, however, illustrate other points that might more accurately explain them.

The permanent obliteration of an artery can only be effected by an inflammatory adhesion of its internal surfaces. The adhesive inflammation of the internal or cuticular coat of arteries is sometimes, but rarely, spontaneous; it is excitable in this, as in other parts, by pressure and by wound.

1. I have seen the aorta just below its curvature, and in another subject, a little above its bifurcation, partially filled by pure lymph, without any aneurismal tendency.

2. The obliteration of an artery by pressure is a more frequent occurrence, as in the natural cures of aneurism and in those effected by art. I have a preparation showing the total obliteration of the right subclavian artery by an aneurism of the arch of the aorta. Mr. Blount informs me that he lately saw an aneurism of the thigh, under the care of Mons. Dubois in Paris, cured by steady pressure upon the vessel continued for twenty-four hours. It is not to my purpose to quote or relate cases, because these facts are familiar.

3. It was discovered by the celebrated Desault, that a round ligature drawn tight upon an artery, made a clean cut of its internal coat, and the experiments of Jones, devised and exe-

cuted with equal felicity, have established, that the obliteration of an artery tied with a round ligature, is only the cicatrization of this cut. To ascertain with precision the effects of ligatures of various sizes, both flat and round. I have repeatedly examined the appearances left upon the cuticular coat of the artery after applying them, and the following is a report of such experiments upon the carotid, iliac, and femoral arteries of the human subject.

Broad Tape - -	No distinct impression, but a general longitudinal puckering or 'froncement,' as the French term it, of the internal coat, especially opposite the knot.
Narrower Do. Do. - -	
Narrow Tape - -	The same, with partial laceration.
Narrower Do. Do. - -	Cuts with a fretted edge, or partly cuts and partly tears.
Flat Bobbin - -	The same.
Large Round Do. - - -	Cuts cleaner.
Twist - - - -	Clean and narrow incision.
Twine - - - -	
A round ligature including a sheath of linen upon the artery -	Faint, but distinct incision.
Do. including a cylinder of quill, wood, or other firm substance -	Deep, but somewhat partial incision.

From these observations it appears that the flat ligature, as it is diminished in breadth, and admits of being more strictly applied, *i. e.* as it approaches to the form and size of the round ligature, imitates its operation, but fails to produce a simple incised wound, which every body knows is the wound best disposed to unite by adhesion. The inclusion of substances soft or hard in the round ligature does not materially alter its effect.

It being established that the internal coat of an artery is prone to take on the adhesive inflammation, and that it is only by virtue of this inflammation that the vessel can be permanently obliterated, it is not a question of difficult solution, whether the mere apposition of sound surfaces, the apposition of bruised and lacerated surfaces, or the apposition of fresh cut surfaces is the condition most favourable to union. What is the result of our familiar observation in practice, of the

comparative efficacy of pressure, of bruising and tearing, and of cutting, to excite adhesive inflammation? The obliteration of a hernial sac under the pressure of a truss, of an artery overlaid by a heavy tumour, and in general the cementing of entire surfaces, is a chronic process. Contused and lacerated wounds oftener suppurate or even slough, than kindly take on the adhesive inflammation. Surgeons anxious to procure a rapid union of parts, incise them for that purpose, as in the hare lip. The severe operation for hydrocele by incision rarely fails of its object.

It is curious to observe the revolution which has taken place within a few years in this branch of surgical practice, since experimental inquiry has furnished the true explanation of the principle upon which the ligature acts.

Mr. Hunter and the surgeons who after him practised the operation for the popliteal aneurism, were in the habit of applying the ligature with force only sufficient to bring the sides of the vessel in contact; and some included an extraneous body, as a piece of cork or wood, or a roll of linen, to prevent the lesion of the artery in the act of tightening the ligature. The fear of cutting the coats of the vessel was uppermost in the minds of all, and next to this, the fear of quickening the process of ulceration, and the casting off of the ligature. Scarpa, Richerand, and the other eminent surgeons of the continent are still fettered by these fears. But we see that they are groundless; that, on the contrary, the security and effect of the ligature are ensured by its cutting the middle and internal coats, which it does without danger to the outer, however applied; and that retarding the process of ulceration when the ligature has done its duty, is not only useless but mischievous, as it increases the danger of secondary hemorrhage.

Jones, whose scientific and comprehensive view of this important branch of surgery,* must excite universal regret for

* See "A Treatise on the process employed by Nature in suppressing the hemorrhage from divided and punctured Arteries, and on the use of the ligature, with observations on secondary hemorrhage." London, 1802.

his loss and respect for his memory, ascertained, that the effusion of lymph from the wound inflicted by the ligature was sufficient, even if the ligature were removed upon the instant, to obstruct the artery. By including a loose thread along with the artery in the ligature, he readily withdrew the latter after the infliction of the wound. In one instance he succeeded with a single ligature, and in several instances with two, three, or four, made at a small distance apart. The lymph effused was in proportion to the extent of the section, or if this was incomplete, the union was equally so. He was led to conclude that the complete circular section of the internal coat was indispensable to union, and the success which attended his experiments led him to conjecture, that in some surgical cases, removing the ligature as soon as it was made would be an efficient operation. This suggestion, the value of which he left to be determined by future experimenters,* was caught at with eagerness by his readers, and by many considered to be the essence of his publication. It required little sagacity to discover the advantages which would result to practice, if it could be shown, that the effect of the ligature which heretofore required fifteen or twenty days, could be attained with equal certainty in little more than as many seconds. But just as was this calculation in theory, it was not yet realized in practice, and the fact was chiefly valuable as it afforded conclusive evidence of the principle which he had established, viz. that the obliteration of an artery was effected by the adhesive inflammation. For if the disposition of the cuticular coat to effuse lymph was such, that in some cases the mere wound, setting aside apposition of its edges, the condition commonly necessary to union, was sufficient to produce it, *a fortiori*, the wound of which the sides were kept in contact, would in all cases unite and by the

* "I leave the fact (viz. the complete obstruction of an artery consequent upon the momentary application of a ligature) for those who have opportunities of applying it in practice, when all the circumstances which determine its success or failure shall have been fully ascertained by further experiments on brutes." Jones on Hemorrhage, p. 136.

same medium. But the result of these experiments neither warranted the conclusion that the complete incision of the internal coat was necessary to union, nor that union was a necessary consequence of such an incision. The history of the broad tape or ribbon ligature, proves that contact without wound will sometimes produce adhesion, and the frequent repetition of Jones's experiment has proved, that wound without contact will often fail to produce it. Among others Mr. Dalrymple, surgeon, of Norwich, has decided the latter point by many trials. He informs me, that he "has repeated the second experiment of Dr. Jones's third chapter, of which the results are represented in his eleventh plate, not fewer than seven times on the horse, and three times on the sheep; and that in every instance he has failed to obtain his results. Not only has no coagulum been formed; but even where the subject of the experiment has been suffered to live until the thirteenth, fifteenth, or eighteenth day after the operation, the canal of the artery has not been found obliterated. In every instance, indeed, its calibre has been contracted; still however it has remained pervious in degree and capable of transmitting a lessened column of blood." The results of these experiments collectively, lead Mr. Dalrymple to the conclusion "that the internal and middle coats of an artery may be divided, the external tunic remaining uninjured, without being followed by the formation of a coagulum, or the obliteration of its canal." I am a good deal surprised at this notable difference in the results obtained by two experimenters of so much accuracy and discernment. To the presence or absence of the coagulum of blood no primary importance attaches, as it is a consequence only of the obliteration of the canal, and of that not always. The contraction of the vessel, contraction being invariably the concomitant of cicatrization, must always be the consequence of a wound of its coats. And the stated difference of result between the case in which the ligature is taken off the vessel and that in which it remains upon it, I should explain thus: in the former, union takes place between the edges of the severed coat side

by side (contraction), while in the latter it takes place between the opposite sides (obliteration).

The original experiment of Jones, in whatever light we view it, is of unquestionable importance, and deserves to be highly appreciated. While its occasional failure demonstrates that the apposition of the cut surfaces is essential to the certain obliteration of the vessel, its occasional success establishes that, *cæteris paribus*, it cannot, with this precaution, fail of its intention. And although uncertainty of result may preclude its application to practical surgery, I should little question its efficacy as a remedy for the aneurism, whether it simply diminished or totally arrested the column of blood, since the only theory of cure in this disease, obvious to my mind, is the diminution of the blood's impulse in the diseased and resistless artery. And here I cannot help observing, of what vast importance it is to the progress of science, to register facts of which the use is at present imperceptible or at most indistinct, as beacons for future travellers on the same road. If we reflect how many discoveries have been the creatures of accident, and how few have been led up to and perfected by one and the same mind, it will not appear unfair to conclude, that some may have been obscured and others lost, from a too light estimation, or a wilful disregard of these indirect aids and clues to knowledge.

From what has been said of the experiment of Jones, it will be understood, that it is evidence over and above what was required, to prove that the wound of an artery is united by the same process as a wound of the skin, but that like this the wounded surfaces require to be supported in contact.

II. It would be well if a surgeon, before tying up the main artery of a limb, were to turn in his mind the series of changes of which this operation is the commencement, the nature and relation of these changes to each other, and the degree in which they may be influenced by the form of the ligature and the mode of applying it.

First, the internal coat is to be excited to an inflammation

sufficient for the *vasa vasorum*, as they are called, to pour out lymph, by which the part of the artery adjoining the ligature becomes thickened, and being contracted in the form of a cone, is united at its apex. Within twenty-four hours this process should be considerably advanced, for at this early period begins the ulceration of the exterior tunic in consequence of the pressure of the ligature. The time required for its liberation varies according to the perfect or imperfect application of the ligature. In the arteries of the dog which are much smaller than the human, ulceration is generally completed in six days. I pass over the clot of blood, because its presence is accidental, though not always unimportant: the gradual obliteration of the old and the enlargement of the new channels of circulation, because these are indirect consequences of the obstruction which do not affect the security of the ligature; but there are direct changes to take place external to the artery. The capillaries of the wounded cellular membrane must assume the healing or adhesive action, and exude their lymph over and around the artery and into the cells of the membrane surrounding it, so that the ends of the vessel may be covered by lymph and the wound be in part filled by it, in six hours. Soon this lymph becomes organized, having a red and granulated appearance; it goes on increasing in thickness until it completely envelopes the vessel, and becomes so firmly compacted therewith as to make its extremities indistinguishable. After all this, after the severed vessel is thus carefully protected and fortified by a solid bed of lymph, and the wound is on the point of healing, a passage for the ligature is to be ulcerated through the lymph, and if, unluckily, the wound has closed over the ligature, an abscess must be formed to discharge it.* This is an outline of the changes which are required to ensue, and in the failure of one or other of them, the loss of a link in the chain, we may discover a cause of secondary hemorrhage.

* See Mr. Hunter's first case in the "Transactions of a Society for the Improvement of Medical and Chirurgical Knowledge."

First, the inflammation of the cuticular coat of the artery may be deficient, or not a pure adhesive inflammation, and no healthy lymph be effused. This may arise from the debility of a constitution worn out by disease, from a morbid change in the texture of the vessel, as a deposition of earthy matter in its coats, or a pre-existing erythematous state of the internal tunic; or it may be owing to the use of a ligature which simply approximates the sides of the vessel, or of one which fritters the cuticular coat to rags instead of simply dividing it. Unhappily, neither of these causes will bar the ulcerative inflammation; they will rather predispose to it, and to such a condition of it as will not be bounded by the ligature.* But should the ulcerative absorption be completed at any point of the cylinder, and no union have taken place, the only security against secondary hemorrhage will be derived from the casual existence and extent of the internal clot of blood.

Secondly, the adhesive action within the vessel may have been healthy and the union of its sides completed at a sufficiently early period, but the muscular parts in the vicinity of the artery having been extensively and rudely torn asunder by the operator's fingers in searching for it, a large portion of it denuded of its sheath in placing the ligature upon it, and perhaps all this violence committed upon a half hectic subject, sinuses are formed upward and downward in the course of the artery.† Here the ulcerative action is undefined by the adhesive. The matter lodges about the artery and dissects the muscles far beyond the limits of the wound, and there is much reason to fear that the ulcerative absorption, by which the ligature is discharged, instead of being confined to the circle of the ligature, will extend upon the parietes, partially as they are defended by coagulable lymph, and destroy this lymph, together with the newly cicatrized extremities. In this way secondary hemorrhage is produced in stumps that ulcerate deeply after amputation, and in abscesses in the vicinity of

* Mr. Home's case of Mr. Marshall, ibid. vol. II.

† Mr. Hunter's 2d case. Mr. Birch's and Mr. Cline's cases, ibid. vol. I.

large arteries. I must remind the reader that the spontaneous steps of nature, in the suppression of hemorrhage from wounded arteries, differ only in the outset from those which follow the employment of the ligature. The blood extravasated into the sheath of the wounded vessel does the office of the ligature; *i. e.* it forms the temporary barrier until the coagulable lymph is effused under the adhesive inflammation, which constitutes the permanent one. This analogy premised, I shall here relate a remarkable case of a wounded femoral artery, to show how the lymph, which seals the vessel, being destroyed by ulceration in common with other parts, this admirable resource of nature is cut off.

CASE.

Ann Mould was brought into Guy's Hospital on the 2d of December, 1811, intoxicated. She had been run over by a coach. The wheel had passed over the lower and back part of both her thighs. A small deep wound was found in the ham, from which there was a free hemorrhage, to appearance venous. The wound was dilated, but no bleeding vessel discovered; it was dressed, and a gentle pressure applied. From the swollen state of the limb it was thought right to keep up evaporation from the surface. It was evident, for some days after the accident, that an internal hemorrhage was going on, and the blood extravasating between the flexor muscles on the thigh. The integuments of the whole limb became distended and the wound turned sloughy. Fomentations and poultices were applied; an ichorous and bloody matter issued from the wound, and the swelling of the limb was somewhat diminished. On the 14th of December the wound had assumed a much healthier appearance, and things seemed fair for recovery.

On the 17th at ten o'clock at night, Mr. La Serre was called to his patient on account of so profuse a bleeding from the femoral artery, that he found her dying upon his arrival at her bedside.

Dissection. A large ulcerated cavity, containing blood and pus, was found between the muscles which form the hamstrings. The femoral artery had been completely divided, its extremities retracted and thrown out of their relative situation. It was plain that the artery had been severed, for the mouth of the inferior portion was conical and sealed by lymph. The other end of the vessel terminated abruptly in the abscess, a very small crust of blood lying within it. The ulceration was extending in this direction, having destroyed the sheath, dislodged the external clot, and opened the cicatrized extremity of the artery. From this the fatal hemorrhage issued.

The deposition of lymph, internally and externally, is induced by the same inflammation, and takes place at one and the same time, and both concur essentially to the security of the vessel; when therefore the external deposition is destroyed by a supervening ulceration, the security is diminished in the proportion of its importance. Mr. Abernethy mentions a case, wherein ulceration extended to the iliac artery from an adjoining lymphatic gland, by which a great hemorrhage was caused, while the ligature below remained firm.*

There is yet another and a prolific source of secondary hemorrhage, even where the ligature has done its duty; I mean the direct sloughing or gangrenous inflammation of the arterial extremity. This happens in aneurisms and amputations upon persons of irritable habits; in casualties which deeply shock the nervous system; and occurs most especially in the wards of crowded hospitals, where gangrene has become contagious.

EXPERIMENT.

Two ligatures were applied on the femoral artery of an ass, at the distance of one quarter of an inch, and were immediately cut away. On the following day the thigh was tumid and hot, and the wound soon ulcerated extensively, yielding a copious and offensive sanies. This condition of the parts in-

* Surg. & Phys. Essays, Part III. p. 167.

creased until the fourteenth day, when the animal was killed. It appeared, on dissection, that the ulceration had extended farther internally than externally, having spread among the muscles and under the skin, for many inches above and below the original wound. A clot, one inch and a quarter in length, was found within the artery, the effect of the obstruction which had been established by the adhesive inflammation. The portions of artery, which had been included between the ligatures and the lymph contained in it, and surrounding it, were actually in a sloughing state. Beyond this part, the upper and lower portions of artery, which were of a deep red colour, adhered to the clot sufficiently to prevent hemorrhage.

This case shows the destruction of the external bed of lymph, and the precarious security maintained against secondary hemorrhage, where the sloughing inflammation has taken place. It might excite surprise, that an operation so favourable to the healing of the wound, should prove so severe in its effects; but these are to be ascribed to the standing posture of the animal, which, as it is unfavourable to the return of the blood, and requires a constant muscular exertion, carries the inflammation beyond its due bounds, and hurries the adhesive into the ulcerative action; as would most certainly be the case in the human subject under the same circumstances. For this reason, the carotid of animals is to be preferred to the brachial or femoral arteries, as the subject of experiment.

CASE.

In the year 1804, an athletic man, enjoying vigorous health, suffered amputation at the thigh at St. Thomas's Hospital, immediately after a compound fracture and laceration of the leg. The arteries were suffered to bleed freely before they were secured.* The stump early put on a very unfavourable appearance, and at the second dressing was in a sloughing

* See Mr. Hunter's excellent remarks on bloodletting after severe wounds and amputations. On the Blood, &c. p. 564.

condition. For the first five days the man had been kept low; after the fifth he had a pint of porter daily. On the ninth day he became delirious, at first through the night only, but after the eleventh the delirium was constant. At this time there was general disturbance of the nervous system with watching, and he muttered, and picked the bed-clothes. His pulse, though full, was intermitting. On the tenth he began to take wine and bark freely in addition to his porter. On the twelfth he lay muttering with his eyes close, and pressed the lids together so closely, as to resist every attempt that was made to open them. He was perpetually waving his hand above the bed-clothes. His pulse was 120, full and regular. He retained the power of swallowing, but passed his evacuations, unconscious of them. He died at the end of the thirteenth day.

Dissection. The stump was excavated by sloughing, and an inch of bone was bare, but in many places the slough had separated, and granulations and good pus appeared. The ligature, on the femoral artery, was so nearly detached that it came away on removing the dressings. There was found, on inspecting the artery, a clot of blood which reached to the first collateral branch, and was one inch and a half long. This coagulum did not quite fill the canal of the vessel, nor did it in the least adhere to its internal coat. The lower was smaller than the upper part of the coagulum, for there the artery was not contracted. The truncated extremity of the vessel was open, ragged and sloughy. There was a very little coagulated lymph round the external coat, at its extremity, but none within it. The internal coat was of a uniform vivid red colour, and this extended even above the bifurcation of the aorta and some way down the iliac artery of the opposite side. The viscera were all perfect and healthy.

This case exemplifies an accidental advantage to be derived from the internal coagulum of blood. Hemorrhage was prevented only by its extent. The conical shape of the clot and the sloughs lying about the extremity of the vessel, evince that it had been contracted, and had undergone the adhesive pro-

cess. Had the collateral branch opened at the distance of three or four lines from the extremity of the artery, the clot, which would have been accurately of the same extent, must have been carried away by the torrent of the circulating blood, when, from the death of the lymph, it became the only remaining stay to hemorrhage.

EXPERIMENT.

The left femoral artery of a large Newfoundland dog was tied with a single ligature. A portion of the sheath and the anterior crural nerve were included in the ligature. Next day the animal was very lame in his left leg, and his toes doubled under him as he walked. There was no sensible change in the temperature of the limb. On the fifth day a hemorrhage took place from the wound. On the sixth day the dog was ill and refused to eat. On the seventh he was found dead, from a return of hemorrhage during the night.

Dissection. A very extensive sloughing of the cellular membrane around the wound had taken place. The artery itself had sloughed at the part where the ligature was applied, and its divided portions had retracted. Each end of the vessel was dead to some distance above and below the slough.

In this experiment an additional cause to the strained position of the limb, probably operated to produce the mischief. This was the inclusion of the nerve in the ligature. See the report of a similar experiment by Pouteau,* followed also by fatal hemorrhage.

It would be superfluous to expatiate upon the obvious and important practical lessons which these experiments convey; first, the perfectly relaxed and easy position of the limb after the operation, from inattention to which Petit lost a patient by secondary hemorrhage;† and secondly, the application of the ligature to the artery exclusively.

* Melanges de Chirurgie, p. 302,

† Mem. de l'Acad. Roy. des Sciences. An. 1732.

The last narrative calls to my mind the case of a female upon whom Mr. Abernethy performed the operation for a popliteal aneurism. Pain and sickness were experienced after the operation, fever and restlessness came on, and a fatal hemorrhage happened on the third day. Dissection showed that the whole surface of the wound was in a sloughy and putrid state. The internal coat of the artery was highly inflamed and its orifice pulpy and sloughy.*

Secondary hemorrhage sometimes results from the laceration of the young and tender cicatrix, when the ligature is violently plucked away. Of this I could recite an instance, but it is not to be classed among the natural causes.

The causes which I have enumerated are three-fold.

1. Failure of the adhesive inflammation.
2. Diffused and extending ulceration.
3. Sloughing or gangrenous inflammation.

These may be severally induced by many other circumstances than those which I have mentioned. Each admits of being aggravated, if it is not occasioned, by unskilful operations and ill adapted ligatures.

III. The desiderata in the operation for aneurism, as it is at present performed, are to excite, with certainty and rapidity, the adhesive union of the sides of the artery; to limit the ulcerative process as much, and to complete it, as early as possible.

I have already pointed out the difference, in the action of ligatures, to accomplish the purpose of their application.

In this country the broad ligature is exploded from reputable surgery;† the ligature in use is round, whether larger or

* Surg. Obs. on Aneurism, p. 229.

† The surgeons of the Continent are greatly behind-hand on this subject, notwithstanding the indefatigable labours of Professor Scarpa. They clearly do not understand the train of actions set up by the ligature. It is astonishing that so intelligent a person as Scarpa should still practise the sheathing of the artery with linen. He cannot surely know, that it is unnecessary to the security of the external coat; and that, in twelve hours, the vessel would be as well sheathed with lymph, which this wadding intercepts, and through

smaller, and two are generally applied at an interval sufficient to admit of the division of the included portion of artery; after which the extremities retract to a considerable distance within the sheath. When the ligature is applied with but moderate tightness, from fear of injuring the arterial coats, it is liable to be thrown off the divided vessel; an event of which I was once a witness. On this account it was proposed to pass a stitch through the artery, to retain it; which, if the ligature were lax, would not prevent hemorrhage, and was an useless precaution if drawn tight, because in this case it indents the external coat in a groove, where it divides the muscular and internal, and thus obtains a firm seat. But I can see no advantage resulting from the division of the artery; and although the practice was introduced upon authority to which I pay the highest respect, the benefit has been rather supposed than proved. If it carries with it no advantage, it is not free from objection. The ligatures must be applied at a greater distance apart, than would be necessary if the vessel were left continuous, and the retraction which ensues upon division, renders the cavity of the wound larger, and the effusion of lymph of necessity greater than it would otherwise be, for this always extends beyond the extremities of the divided vessel. Even though the external wound is of the full extent required for the convenient application of the ligatures, they will be carried to a distance under the muscles and integuments, and the suppuration which they excite will be more profuse and more confined, a circumstance of which I have before shown the evil consequences. If, on the other hand, two ligatures are applied, and the included portion of artery left to fade, or only one ligature is used, a practice much to be preferred, the extremities, being previously fixed by adhesion to the sheath, will retract very inconsiderably, if at all. I was led to this observation by comparing the appear-

which it must work its way by ulceration. Scarpa unfortunately disclaims experiment and holds its results cheap. This ill founded and unphilosophical opinion has materially retarded the progress of surgery, even in this country.

ances of parts in which these different methods of operating had been practised. I tied one carotid of a dog according to the present mode of operating, and the other with a single ligature, and found remarkable difference in the extent of surface of the wound, the distance of the arterial extremities, and the quantity of lymph shed over and around them.

In addition then to the greater simplicity of the operation, the limitation of the bed of the wound, and the casting off of the ligatures at the point of their original application opposite to it, are advantages obtained by the non-division of the vessel. These circumstances are important, as they limit the suppurative and ulcerative processes to a smaller compass, and quicken the separation of the ligature. To some this last might appear an objection, as it was formerly urged against the tight ligature, under the idea that the adhesion might not be previously established. But experiment proves that a due relation is preserved between the leading and the subsequent stages of inflammation; the actions are not single and independent, but form a train and go on in harmony with each other, so that the quickness of the ulcerative is only a consequence of a proportionate celerity of the adhesive action. In this respect the actions of inflammation ensuing upon injury are not strictly morbid, for they bear a stronger affinity to the phenomena of health than of disease, and thus we talk of healthy inflammation and healthy pus. A perfect union by the first intention is the best security against slow or spreading ulceration; and the means above explained, by which we secure a perfect union, tend in the greatest degree to make ulceration quick and definite. Formerly lax ligatures were used to retard ulceration, so that by the same means by which ulceration was rendered slow, adhesion was rendered imperfect.

I have been led to these observations, in considering the present method of operating. But it appears to me that the residence of the ligature on the artery stamps an imperfection on the operation for the aneurism, which the facts ascertained by experiment plainly indicate to be remediable. Such is the

rapidity of the union by adhesive inflammation, that lymph is in a state favourable for organization in less than six hours in a wound, the sides of which are preserved in contact. And long previous to the appearance of that coagulable lymph which is the medium for the inosculation of vessels, a glutinous exudation from the cut surfaces fastens them together. In my experiments on the intestines of dogs I had many proofs of this, and the same thing has been observed in wounds of other parts. But would the pared edges of a hare lip unite by adhesion, favourably as they are disposed to union when brought in contact, if they were allowed to remain asunder? Certainly not. It occurred to me therefore, that if a round ligature were applied and suffered to remain upon the vessel for a few hours, it would have fulfilled the intention of its application, and by its removal at this period, the dangers and inconveniences attending its stay would be obviated. Suppuration, which chiefly results from the irritation of the extraneous body, was never observed in less than twenty-four hours, and very seldom so soon; and although the ulcerative absorption, which sets the ligature free, commences at the period of suppuration, it is never finished in less than eight, seldom in less than fifteen, and often not in twenty days. Now if the opposite lips of the wound in the artery were kept in contact for a time sufficient to ensure their adhesion, suppuration and ulceration of the external coat of the artery would probably never ensue; the artery would be obliterated without losing continuity, and the wound would heal like a simple wound, by the first intention. This reasoning seemed to me plausible enough to justify an experiment or two; I made them, and the following is the report.

EXPERIMENT I.

The right carotid of an ass was exposed by dissection. A piece of coloured twine was laid parallel with the artery, and included with it in a round ligature drawn into a single knot.

The integuments were then stitched together by an interrupted suture, and at the end of six hours the circular ligature was drawn away by the slip of twine. The animal lost very little blood, although from the depth of the vessel and the condition of the beast it was not completely exposed and secured without a considerable separation of parts. The diary of his life for a fortnight succeeding the operation presents nothing worthy of note. The natural functions went on as before, the wound discharging pus freely. I should observe, that the peculiar texture of the integument of these animals causes every wound extending beneath it to suppurate.

In the act of manducation, on the day fortnight of the operation, a stream of arterial blood jetted from the wound. I was present and allowed it to continue; it did so for ten minutes or thereabouts, when the animal fainted; it stopped, and did not afterwards recur.* In two days after he seemed to have recovered the loss of blood, and to be as well as before; and the artery upon examination, appeared to be almost united, in one part.

EXPERIMENT II.

The carotid of a blood horse was tied, a slip of twine being included in that which formed the ligature, as in the preceding experiment. The wound was brought together by a single suture, and the ligature withdrawn by means of the slip in *two* hours. The operation was done at six o'clock p. m. and the animal knocked down fifteen hours after, viz. at nine o'clock of the following morning. The artery, upon examination, was slightly united at one part.

* This blood must have issued from a branch opened by ulceration in the cavity of the wound.

EXPERIMENT III.

The left carotid of the ass which was the subject of the first experiment, was treated in the same manner as the right had been, except that the ligature was withdrawn at the expiration of *one* hour. Next day the animal was killed, having survived the first operation seventeen days, the second twenty hours. The left carotid, on dissection, appeared to be almost united, for some space.*

That the coaptation of the wounded surfaces of the cuticular coat of an artery, if preserved for a short period after the infliction of the wound, renders its obliteration certain, is a fair inference from these experiments. A more extended scale of inquiry, however, is required to establish the uniformity of their results. They afforded evidence that the circulation was arrested, by the absence of the pulse in the artery continuing after the removal of the ligature; and the vessel was therefore concluded to be as impervious as if the ligature had remained upon it. But upon this event I think it would be impossible to calculate with confidence, unless the ligature were suffered to remain upon the vessel for a time sufficient to insure the organised adhesion of its sides. In Jones's experiments, the return of the circulation was invariably ascertained after the removal of the ligature; and he seems to have regarded this as a proof that the subsequent obliteration of the canal was effected by a process independent of the coagulation of the blood. But in all these and similar experiments, the blood, as blood, has no concern in the obliteration of the vessel: the conical coagulum of blood is not formed in the first stage of the obstruction; its formation is gradual, and appears to require a change in the properties of the vessel consequent upon the abolition of its function. And although the presence of the conical clot satisfactorily demonstrates the obstruction of

* The appearances of the arteries on dissection are represented by plates, in the original work.

the canal, it is sometimes very inconsiderable, and at other times deficient, where the obstruction is complete. It is a mistake therefore, to regard the coagulum of blood among the immediate effects of the ligature; it is an incidental consequence only of the permanent obstruction which it has been supposed to constitute; without which it never could be formed; nor, if formed, ever be competent to the purpose of permanently obstructing the canal of an artery.

In the materials of this paper I have derived assistance from my friend and colleague Dr. Farre. It would be injustice to myself, as well as to him, to conceal an obligation, which I feel it creditable to owe, and grateful to acknowledge.

Analysis of the Bones of the Spine, in a Case of Mollities Ossium. By John Bostock, M. D. Vice President of the Liverpool Literary and Philosophical Society, &c.

[From the London Medico-Chirurgical Transactions for 1813.]

Although it is generally understood, that, in the disease called Mollities Ossium, the bones are deficient in their proportion of earthy matter, yet I am not aware of any actual analysis of them that has been made. On this account I embraced an opportunity which presented itself of examining their composition, and I propose to submit to the Society the result of my experiments.

I received from Thomas Christian, of Liverpool, two of the dorsal vertebræ, with their accompanying ligaments and membranes, of an adult female, whose bones were discovered, after death, to be unusually soft and flexible. On account of the extreme softness of the bone it could not be detached from the periosteum: the whole was therefore kept for some days in cold water, in order to separate the blood and other extraneous matters. One of the vertebræ was then digested for about

an hour in warm water; the ligaments and membranes were now easily removed from it; and the bone itself, when dried by a moderate heat, was found to have lost a considerable portion of its weight, and to be converted into a substance of an extremely porous and delicate texture. The body of the vertebra separated with a slight touch from the processes, and the central part of the body itself possessed so little coherence, as scarcely to permit it to retain its usual shape. The water in which the bones had been digested, as it cooled, exhibited, on the surface a layer of fatty matter, and the fluid itself produced a considerable precipitate with the tincture of galls; thus proving that it contained a portion of jelly. After having been dried by a moderate heat, 50 grs. of the body of the vertebra was exposed for two hours to a red heat, when only 13,5 grs. were left of a coarse white powder. The proportion of earthy matter in the processes was still smaller: the whole, which after desiccation weighed 106 grs., was reduced by calcination to 17 grs. A portion of this powder had four times its weight of muriatic acid added to it, mixed with an equal bulk of water, by which it was quickly dissolved with effervescence.

A portion of the bone, in its entire state, was subjected to the action of diluted muriatic acid, and after being digested for ten days, it was removed, well washed in cold water, and then dried by a moderate heat; when it was found to be considerably more soft and flexible than before the experiment. The fluid in which it had been digested was copiously precipitated by ammonia. The bone was then boiled in water for half an hour; by this operation it was entirely broken down into small flakes, while the periosteum was left entire, although diminished in bulk.

These experiments decidedly proved, that this diseased bone was very deficient in the usual proportion of earthy matter. A healthy bone, after having been calcined, retains its form and a considerable degree of hardness, and the digesting of bones in hot water does not materially affect their shape or their texture, unless they have been reduced to small

pieces, or have been acted upon by a high temperature under an increased pressure.

The following method of calculation will enable us to form a rough estimate of the composition of the diseased bone. One quarter of the body of one of the vertebræ, with its investing membrane, was dried, by exposure to the open air for fourteen days, and was found to weigh 52 grs.; the membrane, when detached by boiling, weighed 19 grs., and the bone itself weighed 15,5 grs. What was removed by boiling, amounting to 17,5 grs., must have been the jelly and oil, and of the 15,5 grs. of bone we may conclude, from the effect of calcination, as stated above, that 4,05 grs. alone would consist of earthy matter. In order to ascertain how much of the jelly and oil was contained in the bone itself, and how much in the investing membrane, a portion of membrane was digested in weak muriatic acid, then well washed in cold water, and afterwards boiled for some time, by which it was reduced from 33 grs. to 19,5 grs. Hence it will appear, that about 13 of the 17,5 grs. must be given to the membranous matter, leaving 4,5 grs. of jelly and oil for the bone itself. By a simple calculation we shall find, that 100 parts of the bone, independent of its investing membrane, consist of

Jelly and oil -	22,50
Earthy matter -	20,25
Cartilage - -	57,25
	100,00

Although the analysis of bone has engaged the attention of some of the most eminent chemists, both in this country and in France, yet there is still a degree of doubt respecting the exact proportion of its ingredients. This is occasioned by some uncertainty as to the state of the bones previous to their examination, and also from the vague ideas, which, until very lately, were entertained, concerning the different species of animal substances. When bones are analysed, they are gene-

rally used in what is called a dry state; but it is evident that this term can only be employed in an indefinite manner, and that no degree of desiccation can remove from the bones, the oil, and probably a portion of the water, that is diffused through the cells; this can only be accomplished by breaking the bone into small pieces and boiling it; and the process of boiling, at the same time that it removes the oil, will also dissolve the jelly; which probably ought to be considered rather as one of the proper constituents of the bone, than as a substance mechanically diffused through its parts. Without proper precautions there is also reason to apprehend, that the process of boiling would likewise remove part of the membranous matter. These observations apply to the first of the circumstances which I mentioned, and I have only to remark, that even M. M. Fourcroy and Vauquelin, who have paid so much attention to the subject of animal analysis, make no mention of any animal substance, as entering into the composition of bone, except solid gelatine.* Making use, however, of the best data which we possess, we may conclude, that human bones in their natural state, contain considerably more than half their weight of earthy matter, whereas the diseased bone in question contained, in one part, one-fifth only, and in another one-eighth of its weight.

The analysis of the earthy matter of the bone was then attempted in the following manner. A portion of the calcined bone was dissolved in four times its weight of diluted muriatic acid. To this solution ammoniac was added in excess, which threw down a copious precipitate, which was collected and calcined at a red heat (*a*). The fluid had then carbonate of ammoniac added, by which a flocculent precipitate was thrown down in small quantity; this was also collected and dried (*b*). The residual fluid was lastly precipitated by muriate of barytes, and the precipitate was collected and calcined

* Ann. Chim. 47. 258. Mr. Hatchett, in his valuable experiments on bone, only examined the nature of their ingredients, without attempting to ascertain their proportion.

at a red heat (*c*). The precipitate from the muriatic solution by ammoniac (*a*) was boiled in potash, and after being collected and dried, was again boiled in acetous acid; the residual fluid was then precipitated by carbonate of soda, and the precipitate was collected and calcined at a red heat (*d*).

Considering the precipitate by pure ammoniac (*a*) as a mixture of the phosphates of lime and magnesia, and the last precipitate (*d*) as pure magnesia, the quantity of phosphate of magnesia in the former precipitate was estimated. The second precipitate (*b*) was supposed to be carbonate of lime, and from the quantity of sulphate of barytes in the third precipitate (*c*) the quantity of sulphate of lime in the bone was ascertained. The respective quantities were nearly as follows:

Phosphate of lime -	67,2
Sulphate of lime - -	23,2
Carbonate of lime - -	5,6
Phosphate of magnesia	4
	100,0

The composition of the entire bone will be as follows:

Cartilage - - -	57,25
Jelly and oil - - -	22,5
Phosphate of lime -	13,6
Sulphate of lime - -	4,7
Carbonate of lime -	1,13
Phosphate of magnesia	,82
	100,00

The usual tests for iron were employed, but there was no indication of its presence.

Knotshole Bank, near Liverpool,
Dec. 2. 1813.

An Account of the Anastomosis of the Arteries at the Groin. By Astley Cooper, Esq. F. R. S. Surgeon to Guy's Hospital.

[From the London Medico-Chirurgical Transactions for 1813.]

In a paper, which I had formerly the honour of reading to this Society, I endeavoured to describe the course of the new channels for the blood, when the femoral artery has been obliterated by the operation for popliteal aneurism. Since that period I have had an opportunity of dissecting two persons in whom the iliac artery has been tied; and, as one of these had survived the operation a much longer time than the other, an opportunity was given, not only of seeing the blood-vessels, when the course of the blood is established, but also of tracing the gradual progress of the new circulation.

Hypothesis would lead to a belief, that anastomosing vessels would be numerous in proportion to the time which had elapsed from the operation; but the reverse of this is the fact; for at first many vessels convey the blood originally conducted by the principal artery; but, gradually, the number of these channels becomes diminished, and, after a length of time, a few vessels, conveniently situated for the new circulation, are becoming so much enlarged, as to be capable of conveying an equal portion of blood to that which passed through the original trunk.

In examining, therefore, the two limbs, which I have the honour of showing to the Society, many more anastomosing vessels are enlarged in that which had been recently the subject of the operation, than in the limb on which the operation had been performed for more than two years; a circumstance which has not arisen from a more successful injection, as the one had been as well injected as the other.

It may be further observed, that a person who has his iliac artery tied for an aneurism of the groin, recovers the use of the limb much more quickly than when the aneurism is situated in the middle of the thigh; for, in the inguinal aneurism

the principal anastomosing vessels are left free from pressure, but the femoral aneurism is buried so deeply in the muscles of the thigh, that the branches of the arteria profunda are compressed, and the passage of the blood to the lower part of the limb is impeded.

In about six weeks from the operation in the former case, the patient is able to make use of the limb, but in the latter, the muscles of the leg and foot will be some months before they recover their powers, requiring the absorption of the aneurismal contents, and the consequent removal of the pressure upon the nerves and vessels.

This observation, however, applies principally to large aneurisms, on which account, it is desirable in femoral aneurism, if not, indeed, in all others, to perform the operation in an early state of the disease.

One of these cases was that of a man of the name of Garrett Riley, who was a patient in Guy's Hospital, and had his iliac artery tied on the 14th of February, 1811; this man died ten weeks and six days after the operation, in consequence of the bursting of an aneurism at the bifurcation of the aorta; he was sitting, as I was informed, by his dresser, Mr. Barraud, in the square of the Hospital, when he suddenly fainted; he was taken into his ward, and in a few minutes afterwards expired.

Upon inspection of his body, besides the aneurism at the bifurcation, which had burst, five aneurismal swellings will be seen in the limb, which I have now the honour to exhibit to the Society, one at the origin of the arteria profunda in the groin, a second in the middle of the thigh, where the artery pierces the tendon of the triceps, which aneurism was of large size, and was that for which the operation was performed; a third aneurism was placed in the ham, and between the popliteal and femoral there were two smaller aneurisms.

This man was a bricklayer's labourer, and the great exertions he had made in carrying loads up ladders, was, in his mind, the cause of the disease. Upon endeavouring to ascertain the mode in which the blood took its course through the

limb, it was found that the femoral, tibial and fibular arteries were still open, and that the blood was conveyed into the femoral artery by the following anastomoses: The internal pudendal artery formed several large branches upon the side of the bulb of the penis, and these branches freely communicating with the external pudendal artery, had determined the blood into that artery, and by this channel into the femoral; the lateral sacral artery also sent a branch, on the iliacus internus muscle, into the femoral artery, and the ilio lumbar artery freely communicated with the circumflex ilii, so that by these three routes, the blood found direct ingress to the femoral artery.

Numerous branches of arteries also passed from the lateral sacral to the obturator and epigastric arteries, the obturator in this case having its origin from the epigastric.

Beside these arteries, a free communication existed between the arteria profunda and circumflex arteries, with the branches of the internal iliac; first, the gluteal artery sent a branch under the gluteus medius muscle to the external circumflex artery; secondly, the ischiatic artery gave two sets of branches of communication, one upon the gluteus maximus muscle to the arteria profunda, and another upon the sciatic nerve to the internal circumflex artery; the internal pudendal artery also sent a branch of communication to the internal circumflex; lastly, the obturator freely communicated with the internal circumflex.

These then are the channels for the blood in an early date from the operation, but at more remote periods, as the anastomosing branches become larger, they are less numerous, and the description of their course is much more simple.

The second case was that of James Nutter, aged 37, who had the operation of tying the iliac artery performed on the 24th August, 1810, on account of a large femoral aneurism above the tendon of the triceps. This man survived the operation nearly three years, and dying in Guy's Hospital, I had an opportunity of examining his body, and of learning the condition of the parts which had been the subject of the ope-

ration. The external iliac and the femoral arteries were obliterated, excepting about an inch of the femoral artery just below Poupart's ligament, which still remained open, and continued to convey a portion of the blood, but below this part it had become simply a ligamentous chord. The internal iliac artery sent first a very large artery of communication to the epigastric and obturator artery, so that the epigastric was supplied with blood from the internal iliac: secondly, the internal iliac sent an artery of communication upon the sciatic nerve, to the internal circumflex artery. The gluteal artery gave a large branch to the origin of the profunda: lastly, the internal pudendal artery largely anastomosed with the obturator: the obturator, therefore, sprang in this case from two new sources, viz. from the internal iliac and from the internal pudendal artery, and the obturator, thus formed, sent two branches of communication to the internal circumflex artery. The arteria profunda was in this case supplied from two sources directly from the gluteal, and more indirectly from the internal circumflex by the obturator and ischiatic arteries. The external iliac artery was obliterated to the origin of the internal iliac, as other arteries usually are when ligatures are made upon them to the first large anastomosing vessel.* The principal agents then of the new circulation, are the gluteal artery with the external circumflex, the obturator artery with the internal circumflex, and the ischiatic with the arteria profunda; and the obturator artery is supplied with blood principally by the internal pudendal, when the obturator arises from the epigastric artery.

The iliac artery has now been so frequently tied for aneurism of the femoral artery at the groin, that no useful purpose can result from the narrative of a case of that kind, offering no uncommon circumstances. In Mr. Abernethy's works, and

* I have been informed that Mr. George Bell, of Edinburgh, has a preparation of a limb, in which he had divided the femoral artery for popliteal aneurism, and that the obliteration of the artery has not extended to the arteria profunda as usually happens.

in a book published by Mr. Freer, the first and best histories of this operation are given. But in the two following cases, the disease had proceeded to an extent to make the probability of success but small, and the result will show, that the operation may be successfully performed under the most adverse circumstances.

William Cowles, aged 37, came to London from Beccles, in Suffolk, on account of an aneurism in the right groin, which he attributed to his having walked five miles with a heavy burden upon his back, six months ago, and a fortnight before the appearance of the aneurism. Journeying to London upon the top of a coach, a distance of more than one hundred miles, he fell asleep upon his face, and pressing upon the tumour, he observed its surface changed to a gangrenous colour. When he was admitted into Guy's Hospital, the skin was purple in some parts, red in others, and extremely thin. It was obvious no time was to be lost, and the operation was performed upon the day of his admission, viz. the 22d of June, 1808, two ligatures were made upon the iliac artery, and the vessel divided between them.

Nothing unusual occurred until the 30th of June, at ten o'clock at night, when a discharge of dark coloured blood took place from the aneurismal sac, and the swelling became quite flaccid. I ordered a sponge dipped in vinegar and water to be applied upon the swelling.

In the six following days, the skin from the surface of the sac sloughed, so that the aneurismal cavity was completely opened. July the 8th the upper ligature separated, and on the 9th the lower came away.

The wound then looked well, the aneurismal sac granulated; but the man's health beginning to fail, it was necessary to remove him about a mile out of London, where he gradually recovered. This man, who now resides in the neighbourhood of Beccles, was in London this year, 1813, perfectly well.

CASE II.

April 30, 1813.

William Martin, aged 27, was admitted into Guy's Hospital under the care of Mr. Forster, for a fracture of the olecranon, and after having been in the hospital three weeks, he requested his dresser (Mr. Johnson) to examine a swelling in the left groin, which proved a femoral aneurism, seated at a small distance below Poupart's ligament, and the integument over it was in a mortified state, being of a dark colour, and having three vesicles upon its surface.

As it was thought that an operation was immediately necessary, and Mr. Forster was not at the hospital, I was requested to see him. The man said that the swelling had been growing nearly twelve months, and had a pulsation when he first observed it. He attributed its commencement to an attempt to raise $3\frac{1}{2}$ cwt. about three weeks before he first observed it.

The mortified state in which it was, he attributed to walking the distance of four miles, three days before it was shown to his dresser.

The tumour was as large as an orange; the pulsation in it very strong; its most projecting part was livid, and the surrounding parts of a deep red colour.

It appeared to me that no time was to be lost, and I immediately proceeded to tie the iliac artery. It may not be improper to remark, that the incision which I make for this purpose, is different from that usually advised: for I begin it just above the abdominal ring, and carry it half an inch above Poupart's ligament, in a semilunar direction, to one inch upon the inner side of the anterior and superior spinous process of the ilium.

Two ligatures were applied upon the artery, and the vessel divided between them.

The ligatures separated on the 17th day.

On the 23d day after the operation, an incision was made

into the aneurism, through the eschar, and the coagulated blood was discharged: the opening from the artery into the sac was very visible, but there was no bleeding from it.

The wound continued in a sloughy state for about three weeks, and then began to granulate; and although the restorative process went on slowly, the man was, after several weeks, discharged from the Hospital, completely cured, no lameness remaining.

Pathological Researches respecting the Diseases of Joints. By B. C. Brodie, Esq. F. R. S. Assistant Surgeon to St. George's Hospital, and Lecturer on the Theory and Practice of Surgery.

[From the London Medico-Chirurgical Transactions for 1813.]

As the articulations of the human body are composed of various parts, each possessing its own peculiar anatomical structure, we cannot but suppose that they are subject to a variety of diseases. It is also reasonable to conclude, that these diseases may differ with respect to their causes and progress; that they may be attended with different degrees of danger to the affected organ, and that for each there may be certain remedies better adapted than others for its relief. Remarks so obvious cannot be regarded as original, yet I am not aware that any one has undertaken to investigate the subject with a view to make a classification of the morbid affections to which the joints are liable, and still less has it been attempted to point out the diagnostic marks by which they may be distinguished, and the methods of treatment which they respectively require. The terms white swelling, scrophulous joints, carious joints, &c. have been employed almost indiscriminately, and I believe it will be found, that the same name has often been applied to different maladies, and that the same malady has been spoken of under different appellations.

Yet no part of chirurgical science appears to be much more worthy of attention. The diseases of joints are of very frequent occurrence: some of them go on towards an unfavourable termination, in spite of whatever remedies are adopted; others are capable of being materially relieved or completely cured: they are all formidable if neglected. It is very desirable that we should be capable of forming such a distinction of these diseases, as may enable us to determine in what case a cure may, or may not be expected; and in the former, what applications or medicines may be employed in preference, and with the fairest prospect of advantage.

Perhaps nothing has contributed in so great a degree to the modern improvements in surgery, as the practice of examining the changes of anatomical structure which disease produces, particularly in those cases where there has been an opportunity of witnessing the previous progress and symptoms of the complaint. There seems to be no better foundation for a scientific arrangement of diseases, or for acquiring a knowledge of the characters by which they are to be distinguished; and the having ascertained in what the deviations from the natural actions of the animal body consist, is at any rate an important step towards understanding the method, by which such deviations are to be corrected.

If a joint be examined in the most advanced stage of a disease, all the parts composing it are found blended into a confused mass, in which it is impossible to distinguish the original nature and seat of the morbid action. It is only where an opportunity presents itself of making the dissection at an earlier period, that we are likely to procure that kind of information which is calculated to throw light on this subject. But such opportunities are of comparatively rare occurrence, since the joints are not vital organs, and the affections to which they are liable seldom prove fatal, or even require amputation, until they have made considerable progress; and this circumstance is, in itself, sufficient to form a very material obstacle to the improvement of this branch of pathology.

It is only by the successive labours of many individuals, that any part of a science so difficult and so obscure as those of medicine and surgery can be brought to a state at all approaching perfection: but this, instead of operating in a contrary manner, should rather form an inducement to each person, who possesses the means of gaining experience, to lay the results of his experience before the public; to bring them into the common stock, and contribute, as far as it is in his power, to the general improvement of his profession. The observations, which I have now the honour of presenting to the Society, are, for the most part, drawn from cases which have come under my notice within the last few years, in one of the principal hospitals of this metropolis. They relate to the pathological history, and classification of the diseases of joints. Should this communication be favourably received, I may, on a future occasion, venture to offer some additional remarks on the diagnostic symptoms by which these diseases may be distinguished, and the different methods of treatment which they require for their relief.

II.—*On the Inflammation of the Synovial Membranes.*

The soft parts which, added to the bones and cartilages, constitute the structure of the joints, are the synovial membrane, by which the lubricating fluid is secreted; the ligaments, by which the bones are connected to each other; and the fatty substance, which occupies what, in certain positions, would otherwise be empty spaces. It is to be supposed that the adipose membrane belonging to the joints may be inflamed; that it may be the seat of abscesses and tumours, as well as that which is situated beneath the skin, or in the interstices of the muscles; and the ligaments cannot be regarded as more exempt from disease than the fibrous membranes, which they very nearly resemble in their texture. The ligaments and the fat of joints are sometimes inflamed in consequence of mechanical injury; and I cannot say that I have never seen a case where disease, independently of this cause, has originat-

ed in them; but I certainly have met with no instance where it has been proved to have done so by dissection, and it may be safely asserted, that this is a rare occurrence, and not what happens in the ordinary affections to which the joints are liable.

On the other hand, no part of the body is much more frequently diseased than the synovial membranes. This is what their anatomical structure and their functions might lead us to expect, since we generally find, that living organs are more subject to have their natural actions deranged, in proportion as they are more vascular, and as they are employed in a greater degree in the process of secretion.

For a more particular account of the synovial membrane, I may refer to the authors who are quoted below.* At present it is sufficient to observe, that its office is to secrete the synovia, by which the motion of the joints is facilitated; that it lines the ligaments, by which the bones are held together; covers the bones themselves for a small extent, and thence passes over the cartilaginous surfaces and interarticular fat. Where it adheres to the bones and soft parts, it very much resembles the peritonæum in its structure, and possesses considerable vascularity; but where it is reflected over the cartilages it is thin and readily torn, and contains no vessels capable of carrying red blood:—its existence however, even here, may be always distinctly demonstrated by a careful dissection. The synovial membrane of a joint forms a bag having no external opening; in this respect resembling the peritonæum, the pleura, or the pericardium, which it also resembles in its functions, and to which it bears some analogy in its diseases.

Cases occasionally occur, in which a joint is swollen from a preternatural quantity of fluid collected in its cavity, without pain or inflammation. This may be supposed to arise, either from a diminished action of the absorbents, or an increased action of the secreting vessels. The disease may be compared

* Bichat. Traité des Membranes. See also Dr. William Hanker's Pape on the Structure of Cartilage, in the 42d vol. of the Phil. Transactions

to the dropsy of the peritonæum, or pleura, and it has not improperly been designated by the terms *hydrops articuli.*

It more frequently happens that there is swelling from fluid in the joint, with inflammation and pain. Here we may presume that the disease consists in an inflammation of the synovial membrane, with a consequent increase of the secretion from its surface; and this is confirmed by the appearances observed in those cases, in which an opportunity occurs of examining the affected parts after death.

In many instances, while there is still pain and inflammation in the joint, the fluid in its cavity is felt indistinctly, as if a considerable mass of soft substance lay over it. Often, when the inflammation has subsided, and the fluid is no longer to be felt, the joint remains swollen and stiff, painful when bent or extended beyond a certain point, and liable to a return of inflammation from slight causes. The appearances observed in the following cases, in which there was an opportunity of examining the effects which the disease had produced, seem to throw light on this subject.

CASE I.

A middle-aged man was admitted into St. George's Hospital, in September, 1810, on account of a disease in one knee. The joint was swollen and painful, with slight stiffness: fluid was felt in its cavity. The swelling extended some way up the anterior part of the thigh, behind the lower portion of the extensor muscles. It subsided under the use of blisters and liniments. Two months after his admission into the hospital, he was seized with a fever, apparently unconnected with the disease in the knee, of which he died.

On examining the affected joint, the synovial membrane was found much dilated, so that it extended up the anterior surface of the femur, behind the extensor muscles, at least an inch and a half higher than usual. Throughout the whole of its internal surface, except where it covered the cartilages, the

membrane was of a dark colour from inflammation; the vessels being as numerous, and as much distended with blood, as those of the tunica conjunctiva of the eye in a violent ophthalmia. At the upper and anterior part of the joint, a thin flake of coagulable lymph was effused from the inner surface of the synovial membrane, of the size of a half-crown piece. There was no other appearance of disease, except that, at the edge of one of the condyles of the femur, the cartilage adhered to the bone less firmly than usual.

CASE II.

A. B. a young man, in the spring of the year 1808, in consequence (as he supposed) of exposure to damp and cold, became affected with a painful swelling of one of his knees. Under the treatment employed by the practitioner whom he consulted, the pain and swelling, in good measure, but not entirely, subsided. Three months after the disease first took place, he was admitted into St. George's Hospital. At this time the knee was swollen, painful, and tender. The swelling had the form of the articulating ends of the bones. The leg was confined nearly to the straight position, and admitted of very little motion on the thigh. His general health was unaffected.

Blood was taken from the knee by cupping, and afterwards it was rubbed daily with mercurial ointment and camphor. Under this treatment the pain and inflammation subsided, and the swelling and stiffness were in some measure lessened. It afterwards became necessary to amputate the limb on account of another disease. The operation was performed on the 15th of December, 1808, and I did not neglect the opportunity of examining the joint.

The bones, cartilages, and ligaments were in a natural state. The synovial membrane was about one-eighth of an inch in thickness, and of a gristly texture. It was closely attached to the surrounding cellular membrane and fascia by means of

coagulable lymph, which had been formerly effused on its external surface.

These cases seem to explain the usual consequences of inflammation of the synovial membrane. It occasions, 1. a preternatural secretion of synovia; 2. effusion of coagulable lymph into the cavity of the joint; 3. in other cases, a thickening of the membrane, a conversion of it into a substance resembling gristle, and an effusion of coagulable lymph, and probably of serum into the cellular structure, by which it is connected to the external parts.

I have seen several cases, where, from the appearance of the joint, and the symptoms, there was every reason to believe that the inflammation had produced adhesions, more or less extensive, of the reflected folds of the membrane to each other; and I have observed, occasionally, adhesions in dissection, which may reasonably be supposed to have arisen from inflammation at some former period.

These effects of inflammation of the synovial, very much resemble those of inflammation of the serous membranes. There are, however, some points of difference. In the former, I have reason to believe, that suppuration rarely takes place independently of ulceration; but this is a frequent occurrence in the latter. Inflammation of the peritonæum, or pleura, though very slight in degree and of very short duration, terminates in the effusion of coagulable lymph; but it is only violent, or long continued inflammation, which has this termination in the membranes of joints.

The slight adhesion of the cartilage to the bone, in one of the cases which have been related, we must suppose to have proceeded from the greater disease in the synovial membrane. I shall have occasion hereafter to remark, that the same thing may be observed where the cartilage is about to ulcerate. I have known a few cases, in which there was extensive destruction of the cartilages of a joint, and which, from the previous history and symptoms, there could be no doubt was occasioned by neglected inflammation of the synovial mem-

brane. I believe, however, that this does not frequently occur, and that in most cases where the two diseases are combined, the ulceration of the cartilage is the primary affection, and the inflammation of the synovial membrane takes place subsequently, in consequence of the formation of an abscess in the cavity of the joint.

The inflammation of the synovial membrane is sometimes acute, but more frequently it assumes the chronic form, and then it is very often confounded with other more serious maladies, under the general appellation of white swelling. Perhaps nearly one half of the cases to which this term is applied are of this description. The disease takes place from various causes, but in most instances from the application of cold, which explains why it is more liable to occur in the superficial joints, such as the knee and ankle, than in the hip and shoulder, which are defended, by a thick mass of soft substance, from the influence of the external temperature. The disease may also arise from the use of mercury exhibited in too large quantities, or in particular constitutions; from rheumatism, and a generally debilitated state of the system. In these cases the inflammation is to be considered as a symptom of a constitutional complaint; often affecting several joints at the same time; leaving one joint to attack another; and it is for the most part less severe, and less disposed to terminate in the effusion of coagulable lymph and thickening of the membrane, than where it is entirely a local disease.

III.—*On Ulceration of the Synovial Membrane.*

When an abscess has formed in a joint, an ulcerated opening takes place in the synovial membrane, through which the matter is discharged. The following are the only cases, which have come under my observation, where ulceration of the synovial membrane has occurred as a primary affection. The most remarkable circumstance, which they demonstrate, is, that a disease, apparently slight, and of a part which is in no way concerned in the vital functions, should produce such a

degree of disturbance of the constitution as to occasion death. Of this however, they form, by no means, a solitary example; and every surgeon and physiologist will be able to call to mind numerous other instances, which show, that an impression upon a small part of the nervous system may derange, and ultimately destroy, the functions of the whole animal machine.

CASE III.

A young lady nine years of age, being at play, on the 1st of January 1808, fell and wrenched her hip. She experienced so little uneasiness, that she walked out, on that day, as usual. In the evening she went to a dance; but while there, was seized with a rigor, was carried home, and put to bed. Next morning she was much indisposed, and complained of pain in the thigh and knee. On the following day she had pain in the hip, and was very feverish. These symptoms continued; she became delirious, and she died, just a week from the time of the accident.

On inspecting the body, on the following day, the viscera of the thorax and abdomen were found in a perfectly healthy state. The hip joint, on the side of the injury, contained about half an ounce of dark-coloured pus; and the synovial membrane, where it was reflected over the neck of the femur, was destroyed by ulceration for about the extent of a shilling.

CASE IV.

A middle-aged man who had, a short time before, met with a contusion of the shoulder, was admitted into St. George's Hospital, in the winter of 1812. He complained of pain and tendernesss in the shoulder, and a very slight degree of swelling was observable; but his principal disease was a fever resembling typhus in its character, of which he died in a few days after his admission.

On inspecting the body, about half an ounce of thin pus was

found in the shoulder-joint. The synovial membrane bore marks of general inflammation; and in one spot, where it was reflected over the neck of the os brachii, it was destroyed by ulceration for about the extent of a sixpence.

IV.—*On cases in which the synovial membrane has undergone a morbid change of structure.*

There are some diseases which consist simply in a morbid action; there are others in which the morbid action produces a morbid change of anatomical structure. Diseases, of the latter class, differ in their nature in different organs. Thus the tubercles which affect the lungs, in phthisis pulmonalis are never met with in the breast; and cancer, which is frequent in the breast, never attacks the lungs except by extending to them from the contiguous parts. The disease, which I am about to describe in the present section, consists in a morbid alteration of structure which takes place in the synovial membranes of joints, and which, as far as I have seen, is peculiar to these parts. I have never known an instance of the same disease in the serous membranes, which so nearly resemble the former in their nature and functions, nor even in the synovial membranes that constitute the bursæ mucosæ and sheaths of the tendons.

Some years since, in examining a diseased elbow, I found the cartilaginous surfaces completely destroyed by ulceration: an abscess had formed in the joint, and no remains were observable of the natural structure of the soft parts, these being everywhere converted into a pulpy substance, of a light brown colour, and about one-third of an inch in thickness. As the ravages of the disease were very extensive, it was impossible to determine, from the appearances on dissection, where the morbid action had originated. This case, however, differed materially from some others which I had met with, in which the destruction of the cartilages was not attended by any affection of the soft parts, similar to that which has been described. The following cases, which have since occurred,

furnish examples of the same disease in earlier stages of its progress, and show that it begins in the synovial membrane, and that the other parts become affected only in a secondary manner.

CASE V.

In a diseased knee, which was sent to me for examination by my friend Mr. Horn, Surgeon to the Newcastle Infirmary, I found, in the cavity of the joint, about four ounces of a pale yellow fluid, having flakes of coagulable lymph floating in it. The synovial membrane, where it formed the loose folds extending from one bone to the other, where it was reflected over the bones themselves, the crucial ligaments, and the fatty substance of the joint, had completely lost its natural appearance. It was converted into a pulpy substance, in most parts about one-fourth, but in some parts, nearly one-half of an inch in thickness, of a light brown colour, intersected by white membranous lines, and with red spots formed by small vessels injected with their own blood. The synovial membrane on the edge of the cartilaginous surfaces had undergone a similar change of structure, but only for a small extent. The semi-lunar cartilages were entire, but in a great measure concealed by the pulpy substance projecting over them. The cartilages covering the bones, in a few places, were in a state of incipient ulceration.

CASE VI.

Martha Manners, 26 years of age, was admitted into St. George's Hospital on the 6th of March, 1813, on account of a disease in her right knee.

She said that in June, 1811, she first observed the joint to be swollen and stiff; and from this time the swelling and stiffness increased; but in the first instance by very slow degrees. About Michaelmas, 1812, she caught cold, and the swelling

increased more rapidly, but it was not attended with any considerable quantity of pain.

At the time of her admission into the hospital, the right knee measured about two inches in circumference more than the left. The swelling was elastic; prominent at the upper and lower part of the joint, not having the form of the articulating ends of the bones. The joint admitted of motion, but the leg could not be completely bent or extended on the thigh.

Various remedies were employed without the smallest benefit. The stiffness of the joint increased. About the middle of May, she began to experience considerable pain, and soon afterwards an abscess presented itself by the side of the ligament of the patella, which was opened on the 15th of June. The orifice made by the lancet healed in a few days; but she continued to suffer severe pain; her health became much affected, and on the 6th of August the limb was removed by amputation.

On examining the joint, about an ounce of thick matter was found in its cavity. The ligaments were in a natural state. The synovial membrane had undergone precisely the same alteration as in the case which has been just related. The only point of difference that could be observed, was, that the *whole* of that portion of the membrane, which is reflected over the cartilages, had become affected, presenting the same appearance as elsewhere, but being thickened in a less degree. The cartilages had begun to ulcerate in a few spots; but the ulceration had made so little progress, that it might not have been noticed on a superficial inspection.

CASE VII.

Samuel Langford, 24 years of age, was admitted into St. George's Hospital on the 22d of April, 1812.

At the time of his admission one of his knees was swollen to nearly twice its natural size. The swelling was prominent on the anterior and lower part of the thigh. It was soft and elas-

tic; so that at first it appeared to contain fluid, but, on particular examination, the absence of fluid was ascertained, by the want of fluctuation. The leg was kept in the half bent state, and the joint admitted of only a very limited degree of motion. He had no pain, even when attempts were made to move the limb. The skin, over the diseased part, was of a pale colour, with some dilated veins ramifying in it. On each side of the joint, a small orifice was observed, through which the probe might be introduced into a sinus; but the sinuses appeared to be of small extent. His general health was unimpaired.

He said, that two years ago he first experienced some pain in the knee, but it was not sufficient to prevent his going about his usual occupations. Soon afterwards, the joint began to swell, and the enlargement gradually increased from that period. Several abscesses had formed at different times, but the greater number of them had healed.

About two months after his admission into the hospital, the limb was amputated.

On dissecting the diseased joint, the ligaments were found in a perfectly natural state. The whole synovial membrane, except where it was reflected over the cartilages, was converted into a pulpy, elastic substance, of a brown colour, intersected by white membranous lines, in some places half an inch in thickness, in others more; and in those parts where the membrane was reflected over the bones, near the borders of the cartilages, it was destroyed, in spots, by ulceration.

The semi-lunar cartilages were in a natural state, but in a great measure concealed, in consequence of their being enveloped in the mass of substance formed by the diseased synovial membrane.

The cartilaginous surfaces of the femur and patella were extensively, but not entirely, destroyed by ulceration; the ulceration being greatest towards the circumference. On the internal portion of the head of the tibia the cartilage was destroyed only for a very small extent, the ulceration being

entirely confined to the margin. On the external portion of the head of the tibia the cartilage was absorbed to a greater extent. The bones possessed their natural structure and hardness. The cavity of the joint contained matter, and the sinuses communicated with it.

CASE VIII.

Michael Purcel, 16 years of age, was admitted into St. George's Hospital on the 10th of July, 1811, on account of a disease in the right knee.

He said, that in the summer of 1807, he had received a blow on the inside of the joint. Some time afterwards a swelling formed and burst, and some fluid was discharged. In about a week the orifice healed; a slight degree of stiffness only remained, and he was able to follow his usual occupations. He continued well till December 1810, when the joint was observed to be increased in size. From this time the swelling increased, but with no other inconvenience than stiffness of the joint, and a slight degree of pain in walking.

At the time of his admission into the hospital, there was a large swelling of the knee, extending an inch or more up the anterior part of the thigh, under the extensor muscles. The swelling was more prominent in some parts, than in others: it was soft and elastic, and gave to the hand an indistinct sensation, as if it contained fluid. The leg was kept in the half-bent position, and was nearly immoveable on the thigh. He had no pain except on motion or pressure.

On the 28th of November, an abscess burst on the outside of the joint, and discharged a small quantity of pus. After this, other abscesses formed, and burst at various times. The swelling continued to increase.

Amputation was performed on the 6th of April.

On dissecting the amputated joint, all the ligaments were found in a natural state. The synovial membrane had precisely the same appearance as in the last case. In some parts

it was half an inch, in other parts more than an inch, in thickness. The cartilages were for the most part destroyed by ulceration, and carious* surfaces of bone were exposed. The abscesses appeared to have formed in the substance of the synovial membrane, and did not communicate with the cavity of the joint, nor did the joint contain pus.

CASE IX.

A boy, six years of age, was admitted into St. George's Hospital, in March, 1808, on account of a disease in one knee.

The joint was larger than the natural size. The leg was bent at a right angle to the thigh, and admitted of no motion. The skin on the outside was ulcerated to a considerable extent. Various remedies having been employed without success, the limb was amputated on the 29th of April.

On examining the joint, the synovial membrane was found to have undergone a morbid change of structure, similar to that in the preceding cases, but with this difference; that the pulpy substance into which it was converted, projected into the joint, so as nearly to fill its cavity, and adhered to the cartilaginous surfaces. On making a longitudinal section of the joint, the cartilage covering the bones was seen, as a white line about one-tenth of an inch in thickness, connected to the bone on one side, and having the pulpy substance adhering to it on the other. It was, therefore, thinner than natural; but otherwise entire, except at the posterior part of one of the condyles of the femur, where it was destroyed by ulceration for a small extent. There were no distinct remains of the liga-

* In using the term caries, on this and on other occasions, I have considered it as synonymous with ulceration; or, at least, as expressing that state in bones, which corresponds to ulceration in soft parts. Some confusion has been produced in Pathological Nomenclature, in consequence of this term having been employed by some, to express, not only bone which is ulcerated, but that whose surface is exposed from other causes.

ments external to the joint, and only some small remains of the crucial ligaments and semilunar cartilages.

The preceding cases furnish examples of the same disease, in different stages of its progress. The morbid action evidently originates in the synovial membrane, which loses its natural organization, and becomes converted into a thick, pulpy substance, of a light brown colour, intersected by white membranous lines. As the disease advances, it involves all the parts of which the joint is composed, producing ulceration of the cartilages, caries of the bones, wasting of the ligaments, and abscesses in different places.

I have already remarked, that this disease is peculiar to the synovial membranes, at least that I have never met with it in any other part of the body; but it belongs to the same order with the tubercles of the lungs, the schirrus of the breast, the medullary sarcoma of the testicle, and numerous others, in which the natural structure of the affected organ is destroyed, and a new and different structure is added in its place. To these also it bears a near resemblance in its progress. Thus tubercles of the lungs, in the first instance, occupy the vesicular and interlobular substance; but, ultimately, they inflame and ulcerate; abscesses form in them, and then the pleura, the bronchia, and the other contiguous parts become affected. Similar circumstances mark the progress of other maladies of the same description.

In many other cases, in which, however, I had no opportunity of examining the morbid appearances, the similarity of the history and symptoms, and the resemblance in the form and elasticity of the tumour, has indicated the disease to have been of the same nature, as in those which have been related. The complaint uniformly has proved slow in its progress, and sometimes has remained nearly in an indolent state for many months, or even for one or two years; but I have never met with an instance, in which a real amendment was produced; much less have I known any, in which a cure was effected. Indeed there seems to be no analogy that should lead us to

expect so favourable a termination, as I am not aware, that a part that has once completely lost its natural structure, is capable, in any instance, of having that structure restored. The progress of this disease in a joint may be retarded by rest, by the occasional application of leeches, and the removal of those causes which are calculated to excite inflammation; but I have never known more than this to be done either by internal medicines or local remedies. When the cartilages are in a state of ulceration, and abscesses have formed in and about the joint, and the patient's health begins to suffer, it is needless to recommend any other treatment than the removal of the limb by amputation, and to delay this for any considerable time, can be attended with no benefit, and may produce much evil to the patient.

It is a remarkable circumstance, that this affection of the synovial membrane is rarely met with, except in the knee. I have never known an instance of it in the hip or shoulder. It is probable that the influence of the external cold may operate as one of the causes, by which the disease is produced, and this explains why it occurs frequently in the knee, and seldom in the deep seated articulations.*

It is evident from the history of cases in which a part of the living body assumes a new and morbid structure, that this alteration seldom takes place except by slow degrees: and it would add much to the interest and utility of researches in morbid anatomy, if it were more frequently attempted to ascertain what is the first change in the organization of the affected part which disease produces, and from thence to trace

* The account of the fungus articuli which has been given by some German writers, appears to have been drawn, partly from cases of the disease described in this section, partly from cases of inflammation of the synovial membrane. Mr. Russel seems to have taken his history of the pathology of white swelling from cases similar to those which have been related; but we must observe that the term, white swelling, has been applied, almost indiscriminately, to all the affections to which the joints are liable, and by no means confined to that under our present consideration.

the gradual progress of the changes which take place, until the destruction of the natural organization is completed. Whether the following case is to be considered as of the same kind with those already recorded in this section, but in an earlier stage of the disease, cannot at present be determined: but it appears not improbable that it is so; and I shall venture to relate it in this place, in the expectation that it may, at any rate, be of some service in assisting the investigations of future enquirers.

CASE X.

—— Belton, a boy 11 years of age, was admitted into St. George's Hospital in August, 1810, on account of a disease in one knee.

There was but little pain in the joint; it was slightly enlarged, admitted of some motion, but not of complete flexion and extension. His parents said that the disease had begun about a year and a half before his admission into the hospital, that it had increased very slowly, and that he had never suffered from it any serious distress. Various remedies were employed without benefit, and in a short time his friends took him out of the hospital. A few weeks afterwards he died, in consequence of an accumulation of water in the ventricles of the brain.

I obtained permission to examine the body.

The synovial membrane of the affected knee, externally, had its natural appearance. Internally, it was lined by a straw-coloured gelatinous substance, so intimately adhering to it, that it could not be detached, except by an artificial separation. The synovial membrane was encrusted in this manner everywhere except on the cartilaginous surfaces. The gelatinous substance in general appeared about one-eighth of an inch in thickness, but in some parts near the borders of the cartilage, it was much thicker, so as to project considerably into the cavity of the joint. In a few places towards the margin of the

articulating surfaces, the cartilage had begun to ulcerate; in some of these it was entirely absorbed, so that the bone was exposed, but for the most part there was only an irregular ulcerated surface towards the cavity of the joint, the remaining portion of the cartilage being entire, and having its natural adhesion to the bone.

The synovial membrane itself bore no marks of inflammation. In the substance with which it was lined, some vessels were observed ramifying, beautifully injected with their own blood; but these were few in number and only in certain parts. This substance differed in appearance from the coagulable lymph, which is found on the surface of an inflamed membrane; and we may presume, therefore, that the effusion of it was the result, not of inflammation, but of some other morbid action.

V.—*On the Ulceration of the Cartilages of Joints.*

The cartilages of joints differ in some essential circumstances from those which are employed in other organs. The latter are more vascular, more liable to become inflamed; and inflammation in them usually terminates in the deposition of osseous matter. The articular cartilages in the adult possess no vessels capable of carrying red blood. Inflammation is not in them a frequent occurrence; when it does take place, it terminates in ulceration, and not in the formation of bone.

Ulceration of cartilage may be the consequence of inflammation of the cartilage itself, or of the bony surface to which it is connected; but in many instances there are no evident marks of inflammatory action having preceded it, either in one part or the other; and the inflammation which afterwards takes place appears to be rather the attendant on, than the cause of, the ulcerative process.

The ulceration of soft parts is usually, and as far as I know, always attended with the secretion of pus; but it is otherwise with the articular cartilages, in which suppuration seldom takes place, while the ulcer is small, and often the disease

proceeds so far, as to cause caries of the bones to a considerable extent without matter being formed in the joint. This circumstance is deserving of notice. It has been long established that suppuration may take place without ulceration; and it appears, that in this instance, ulceration may take place without the formation of pus.

In the cases, which have been related, the ulceration of the cartilages of the diseased joints was a secondary affection, the consequence of a morbid action originating in the neighbouring soft parts. There are other cases, and those not of rare occurrence, in which the ulceration of the articular cartilages exists as a primary disease.

When the ulceration of the cartilage occurs in the superficial joints, it constitutes one of the diseases, which have been known by the name of white swelling. From cases, which I have met with, I am led to conclude, that when it takes place in the hip, it is this disease, which has been variously designated by writers, the "*Morbus Coxarius*," the "Disease of the Hip," the "Scrophulous Hip," the "Scrophulous Caries of the Hip-joint." At least it is to this disease that these names have been principally applied, though, probably, other morbid affections have been occasionally confounded with it.

CASE XI.

In examining a body, brought into the dissecting room in Windmill Street, I found the cartilage in a diseased state in the joints of both hips, of one of the knees, and of both elbows. In some spots, the cartilages of these joints were altogether destroyed by ulceration, and carious surfaces of bone were exposed; in others the cartilage was not completely absorbed, but it had the appearance of fibres, which were connected at one extremity to the bone, while the other extremity was loose towards the cavity of the joint, and having no lateral connection with each other. The intervertebral cartilages connecting

the bodies of some of the dorsal vertebræ were also in a diseased state. They retained the usual appearance of concentric layers towards the circumference, but in the centre, instead of the white semi-fluid substance, which is met with under ordinary circumstances, they were found to be of a brown colour, of a solid and somewhat brittle texture, composed of several portions having a very slight adhesion to each other. The ligaments, the synovial membranes, and the bones, were all in a natural state, except that the latter were occasionally carious in consequence of the absorption of the cartilage; but the caries was unattended by the formation of matter.

In this case the original disease appears to have been a morbid state and subsequent ulceration of the cartilages. It shows, that where the disposition to it exists, the destruction of the cartilage may take place in several joints at the same time, and I have observed the same thing in many other instances.

The conversion of the cartilage into a soft fibrous structure, I am disposed to believe, is the frequent, though not the constant, forerunner of ulceration. In a woman, who died a week after a severe contusion of the hip, the cartilage of the head of the femur was found in some parts entirely absorbed, in others having a fibrous appearance similar to what has been described, and I have noticed the same circumstance in other cases, sometimes connected with, and sometimes independent of, local injury.

CASE XII.

In another body, which had been brought into the dissecting room, the nates on one side were wasted, and flattened in their form, having the appearance which they assume in the ordinary cases of disease in the hip-joint: and this was very distinct, so that it was observed by the students, as well as by myself, and it led me to examine the hip-joint on that side.

The capsular and round ligaments, the synovial mem-

branes, the fatty substance of the joint, and the bones were all in a perfectly natural state. The cartilage covering the head of the femur, for the extent of a sixpence on one side of the round ligament, was partially absorbed, and what remained of it converted into a fibrous structure, similar to what was observed in the last case.

This dissection might lead to the suspicion that the first stage of the ordinary disease of the hip joint, consists in an absorption of the cartilage from one, or both of the bones composing it; at the same time, no positive conclusion can be drawn from it, since the same appearance of the nates is produced occasionally from other causes, and I had no opportunity of learning what other symptoms had existed previous to death.

CASE XIII.

A boy ten years of age was admitted into St. George's Hospital in April, 1809, on account of a disease of the left hip. The nates were wasted, and flattened; there was pain in the hip and knee, and a large abscess had formed, which produced a tumour on the outside of the thigh. An issue was made with caustic behind the great trochanter. About a month after his admission, the skin over the abscess having become inflamed, I made an opening in it with a lancet, and half a pint of pus was evacuated. The orifice, made by the lancet, healed by the first intention, but in a few days, pus was again collected in the abscess, and the tumour was larger and more tense than ever. The limb became shortened; the abscess burst externally; the boy became affected with hectic symptoms, and died on the 21st of October.

On examining the body, the abscess was found communicating with the cavity of the left hip. The capsular ligament, and synovial membrane, were not distinguished from the other soft parts, forming the parietes of the abscess. There was no vestige of the round ligament, and no remains of car-

tilage on either of the bones composing the joint. The head of the femur was reduced by caries to about one half of its natural size, and from the same cause, the acetabulum was rendered deeper and wider than is natural. At the posterior part, the margin of the acetabulum was more extensively absorbed, and the head of the femur had been drawn out of its cavity, and was lodged on the dorsum of the ilium.

No other disease had been suspected to exist during life. If the boy had ever complained of pain in the right hip, the circumstance had been overlooked, on account of the greater disease in that of the opposite side. Having accidentally cut into the joint of the right hip, I found the cartilage, covering the head of the femur, absorbed for about one-third of its extent, and the surface of bone which was in consequence exposed, was covered by a thin layer of coagulable lymph. The cartilage lining the acetabulum, and all the soft parts belonging to the joint, were in a perfectly natural state, and the bones were of the ordinary texture and hardness.

CASE XIV.

A girl, seven years of age, was admitted into St. George's Hospital in May, 1809, on account of a complaint in the left hip. She had pain in the knee, the limb was shorter than is natural, and the nates were wasted and flattened. An issue was made with caustic behind the great trochanter. Soon after her admission an abscess burst near the crista of the ilium. The disease in the hip appeared to be considerably relieved, but on the first of August she died of an accidental attack of erysipelas.

On inspecting the body, the glutæi muscles of the left side were found wasted, and of a dark colour. A sinus extended from the external orifice of the abscess through the soft parts, and communicated with the hip joint, by an ulcerated opening in the margin of the acetabulum.

There were no remains of cartilage on the surface of the

acetabulum. The exposed bone was in a carious state, and of a dark colour, and the cavity of the acetabulum was rendered deeper and wider than is usual. The greater part of the cartilage was destroyed on the head of the femur, and the small portion of it which remained, was readily separated from the bone. This circumstance is often met with where cartilage is undergoing the process of ulceration.

The capsular ligament was somewhat thicker than under natural circumstances, and more connected with the surrounding parts. There were no remains of the round ligament.

In the anterior part of the joint, a quantity of organized soft substance, resembling that of adhesions, was interposed between the head of the femur and the acetabulum, and behind this was a collection of dark-coloured pus. From these two causes the head of the femur had been separated from the os innominatum, and pushed outwards, and it had afterwards been drawn upwards by the action of the muscles, so that it was lodged on the superior part of the bony margin of the acetabulum. The synovial membrane was of a dark colour, but not otherwise diseased.

On examining the hip of the opposite side, I found the soft parts external to it, the capsular ligament, synovial membrane, and fatty substance of the joint, having no appearance of disease. The cavity of the joint contained about a drachm of dark-coloured pus. The cartilage was absorbed from about one-third of the surface of the acetabulum, but the exposed bone presented no appearance of caries. In some parts of the head of the femur, the cartilage had a fibrous appearance, similar to what has been already described; in other parts it was entirely absorbed, and a carious surface of bone was exposed; and elsewhere it was in a natural state. The round ligament was ruptured by a very slight degree of force, which seemed to arise from the cartilage having been destroyed round its insertion into the acetabulum.

The bones in the neighbourhood of the carious surfaces of the left hip were of a darker colour than usual; but no such

appearance was observed in the bones of the other hip, which were in all respects in a healthy state.

CASE XV.

William Bridges, 21 years of age, was admitted into St. George's Hospital, on the 28th of November, 1810. He gave the following account of his complaint. About the middle of the May preceding he first experienced a pain in the right knee, which was aggravated by walking. At the end of a month, the pain became so severe that he was under the necessity of being confined to his bed. He had slight pain in the hip; but that in the knee was intense, keeping him awake at night. An abscess formed, which in the September following burst on the inside of the thigh.

At the time of his admission, the nates were wasted and flattened; the limb on the affected side was an inch and a half longer than the other; there was a large abscess in the posterior part of the thigh. He was emaciated, and laboured under a hectic fever. An issue was made with caustic behind the great trochanter of the femur, and afterwards a second issue was made in the same manner on the anterior edge of the tensor vaginæ femoris muscle. Under this treatment he experienced for a time great relief, notwithstanding several abscesses burst in different parts of the thigh. He became free from pain; regained his flesh; the hectic fever abated; and the discharge from the abscesses was much lessened. The limb now appeared to be shorter than the other. He continued to mend, till the middle of February, 1811. At this period, the former bad symptoms began to return. He was affected with a constant diarrhœa, and profuse perspirations, and he died on the 26th of March following.

On inspecting the body, the glutæi muscles were found wasted and shrunk, and in many parts their texture was destroyed by the abscesses, which communicated with the cavity of the joint by two ulcerated openings, one on the anterior,

and the other on the posterior part. The abscesses formed several sinuses in the neighbourhood of the joint, and the capsular ligament was in consequence connected to, and in some measure blended with, the other soft parts.

The joint contained purulent matter. The synovial membrane was darker than natural, but otherwise had the ordinary appearance. There were no remains of the round ligament. The cartilages were everywhere absorbed, and the exposed surfaces of bone were in a carious state. The head of the femur was reduced to about two-thirds of its original size, and the acetabulum was rendered deeper and wider, nearly in the same proportion. At the bottom of the acetabulum there was an ulcerated opening, just large enough to admit a common probe, communicating with an abscess within the pelvis. The carious surfaces of the bones had the same dark colour and fœtid smell as in other cases of caries, but otherwise they did not differ from healthy bones.

I could add to the foregoing an account of the dissection of several other cases, in which the hip was affected with the same disease, but it would be only unnecessarily occupying the time of the Society. It will be sufficient to observe, that,

1. In the most advanced stage of the disease, none of the parts entering into the composition of the joint retain their natural structure. The soft parts are blended into a confused mass. Sometimes the head of the femur is completely destroyed by the caries, and there remains only the neck, or a part of the neck, of the bone. Often the projecting margin of the acetabulum is entirely absorbed, so that, instead of a cavity, there is only a broad carious surface of the os innominatum. In a few instances, a portion of the carious bone is found dead, and undergoing the process of exfoliation, or having already exfoliated into the cavity of the joint.

2. In whatever period of the disease the examination is made, the cartilages are found in a state of ulceration; but the morbid affection of the soft parts and bones varies very much,

nor are they much altered from their natural state, except in the most advanced stage of the malady.

From these circumstances, from the presumptive evidence afforded by the sixth Case, and from the appearances in the two following, in which, while the disease had made considerable ravages in one hip, it was in an incipient stage, and wholly confined to the cartilages in the other, we may be justified in concluding, that, in the ordinary cases of caries of the hip, the cartilage is the part primarily affected, and the following may be stated to be the progress of the disease.

1. Ulceration takes place in the cartilages: generally in that of the acetabulum first, and in that of the head of the femur afterwards; sometimes it begins in both at the same time.

2. The ulceration extends to the bones, which become carious; the head of the femur is diminished in size, and the acetabulum is rendered deeper and wider.

3. Abscess forms in the joint; which, after some time, makes its way, by ulceration, through the synovial membrane and capsular ligament, into the thigh or nates, or even through the bottom of the acetabulum into the pelvis. Mr. Astley Cooper has shown me two specimens, in each of which the abscess had burst into the rectum.

4. In consequence of the abscess, the synovial membrane and capsular ligament become inflamed and thickened. The muscles are altered in structure; sinuses are formed in various parts, and at last, all the soft parts are blended together into one confused mass, resembling the parietes of an ordinary abscess.

In giving this statement, it cannot be intended to assert, that the hip is not liable to other morbid affections; and, of course, disease having its origin in the bones or soft parts, may ultimately occasion destruction of the cartilaginous surfaces in this as well as in other joints; but still the conclusion remains, that in the ordinary disease of the hip joint, in that disease which an intelligent surgeon, in a work written expressly on the subject, has denominated "the scrophulous

caries of the hip," the ulceration of the cartilages is the primary affection, and the other parts, in and near the joint, become affected only in a secondary manner.

The appearances observed on dissection explain some of the symptoms by which the existence of this disease is indicated.

1. The glutæi muscles, from want of use, gradually become wasted and flabby. The nates, in consequence, are less prominent than is natural, and this gives them the appearance of being increased in breadth, when, on measurement, no such increase is found to exist.* In some instances even, the nates, on a superficial examination, appear to the eye to be wider than natural, when they are in fact narrower, in consequence of the bones composing the hip having been in part destroyed by ulceration. There are, however, a few cases, where, from the acetabulum being filled with coagulable lymph and matter, the head of the femur is pushed out of its proper situation, and the increased breadth of the nates is not only apparent but real.

2. When the disease is in its most advanced stage, the head of the femur is sometimes completely destroyed, and the muscles pull the great trochanter upwards towards the crista of the ilium. This may be compared to the fracture of the neck of the femur, and the appearance of the limb is the same as after this injury. The toes are generally turned outwards, and the limb is shortened. It sometimes happens that the limb is shortened, the thigh bent forwards, the toes turned inwards, and there is every symptom existing of a dislocation of the hip, upwards and outwards. The following case fully explains the cause of these appearances.

* This alteration in the form of the nates is a symptom, but is not to be considered as a diagnostic mark of disease in the hip joint, since it may be observed in other cases, where from any cause the glutæi muscles have been for a considerable time in a state of inaction. Thus, children are subject to a paralytic state of the muscles of the lower limbs, and in this complaint, if the muscles are affected as high as the pelvis, the nates present to the eye precisely that appearance, which is described above. The difference of the other symptoms enables us to distinguish the two diseases.

CASE XVI.

—— Taylor, a middle-aged man, was admitted into St. George's Hospital, in the autumn of 1805, on account of a disease in his left hip. He laboured also under other complaints, and he died in the February following.

On inspecting the body, the soft parts in the neighbourhood of the joint were found slightly inflamed, and coagulable lymph had been effused into the cellular membrane round the capsular ligament.

There were no remains of the round ligament.

The cartilages had been destroyed by ulceration, except in a few spots.

The bones on the exposed surfaces were carious; but they retained their natural form and size. The acetabulum was almost completely filled with pus and coagulable lymph: the latter adhering to the carious bone, and having become highly vascular. The head of the femur was lodged on the dorsum of the ilium. The capsular ligament and synovial membrane were much dilated, and at the superior part, their attachment to the bone was thrust upwards, so that although the head of the femur was no longer in the acetabulum, it was still within the cavity of the joint.

Since the man did not attribute this disease to any local injury, we may conclude that the ulceration of the cartilage was the primary affection, and that the dislocation had been produced, in consequence of the head of the femur having been first pushed outwards by the coagulable lymph and pus, which occupied the cavity of the joint, and then drawn upwards by the action of the muscles inserted into the great trochanter.

As, from the peculiar situation and connections of the hip, affections of this part are attended with particularly serious consequences, I trust that the foregoing descriptions will not be considered as given too much in detail, especially as it will prevent the necessity of entering with much minuteness into

the history of the ulceration of the cartilages of other joints, in which the progress of the disease, allowance being made for the difference of structure and situation, is the same as in the hip.

CASE XVII.

David Martin, 26 years of age, was admitted into St. George's Hospital on the 25th of July, 1810, on account of a disease in his right knee. He attributed it to a blow which he had received some years previous; but he said, that the symptoms had all been much aggravated within the last six months. At the time of his admission into the hospital, the knee had the appearance of being swollen; but on examination, this was found to arise from the wasting of the muscles, rather than from actual enlargement. The leg was fixed, or nearly so, in the half bent position. The condyles of the femur projected beyond the head of the tibia. He complained of pain, which was particularly severe at night.

An issue was made with caustic on each side of the patella; but the symptoms were not relieved, and an abscess burst on the outside of the joint, discharging a large quantity of matter.

Soon after his admission, he experienced, for the first time, severe pain in the other knee; but this was unattended by swelling, or any alteration in the form of the joint, and the leg admitted of complete extension and flexion on the thigh. The pain continued, but no swelling ever took place.

In the beginning of September, he was seized with an accidental attack of erysipelas. Abscesses formed in different parts of the leg and thigh; and he gradually sunk, and died on the 7th of November.

On inspecting the body, the right leg was found bent so as to form a right angle with the thigh. The head of the tibia had been drawn towards the ham by the action of the flexor muscles, so that the condyles of the femur were unusually protuberant. The lateral ligaments were in a natural state.

There were no remains of the crucial ligaments, or semilunar cartilages. The cartilages of the tibia, femur, and patella had been entirely absorbed. The bones were carious on their exposed surfaces, but not otherwise diseased. The synovial membrane was free from all morbid appearances, except at the points of its attachment to the bones, where, in a few places, coagulable lymph had been effused on its surface.

The left knee, externally, had its natural appearance with respect both to form and size. The leg admitted of complete flexion and extension. On dissection, the ligaments and synovial membrane were found in a perfectly healthy state; but about one third of the cartilaginous surfaces of the tibia and femur were destroyed by ulceration, the ulceration having taken place principally, but not entirely, near the circumference. The cartilage of the patella and semilunar cartilages were entire, but the latter, in some parts, were softer than usual. The bones were free from disease. There was no pus or other fluid in the joint.

The dissection of this case, in which the ulceration of the cartilaginous surfaces was evidently the primary disease, explains well the nature of, at least, many cases of that species of white swelling, which some authors have described, in which there is long continued and severe pain in the joint, before any tumour is observable.

CASE XVIII.

William Bowles, 18 years of age, was admitted into St. George's Hospital on the 1st of December, 1810. He said, that about eleven months previous to his admission, he was seized with pain in his right knee, which was so severe as to keep him frequently awake at night. Six weeks after the pain attacked him, the joint, for the first time, became swollen. He now applied to a practitioner, under whose treatment, joined with perfect rest, the pain and swelling subsided, so that he was able to walk about. In the September following, having

returned to his usual occupations, and used the joint a good deal, the pain and swelling returned.

At the time of his admission the affected knee was about one inch and a half in circumference larger than the other. The swelling had the form of the articulating ends of the bones. The leg was half bent, and all attempts to give it motion gave great uneasiness. The pain which he experienced, was great at all times, but particularly at night, when it very much disturbed his rest.

Soon after his admission, an abscess was discovered on the outside of the knee, which burst in the beginning of February, and discharged a large quantity of matter. On the 18th of March, the limb was removed by amputation.

On examining the joint, the greater part of the cartilaginous surfaces of the tibia, femur, and patella were found destroyed by ulceration. Where the cartilage was destroyed, the exposed bone was carious, and in some places covered by a thin layer of coagulable lymph; but in other respects, the bone was free from disease. There were scarcely any remains of the semilunar cartilages. The joint contained pus, and the abscess in the joint had made its way into the external parts, through an ulcerated opening in the synovial membrane. The synovial membrane was in a natural state, except that, in a few places, there was a thin layer of coagulable lymph on its surface, which, evidently, had been recently effused. The external lateral ligament was destroyed by the abscess: the other ligaments were entire.

In this case, the principal disease observed in the dissection, was the ulcerated state of the cartilages. There was no affection of the synovial membrane beyond what might be considered as arising from the formation of pus in the joint, and the bursting of the abscess externally. Where inflammation of this membrane is the primary disease, swelling takes place often in a few hours, always within two or three days from the beginning of the attack; whereas, in this instance, the constant answer, which the patient gave to the repeated en-

quiries made of him, was, that he had had violent pain for six weeks before the joint was observed to be enlarged. From all these circumstances, we may conclude, that in this case, as well as in the last, the cartilages were the original seat of the disease, and that the morbid appearances observed in the soft parts were the consequence of the formation of the abscess in the joint.

CASE XIX.

Jane Bannister, 40 years of age, was admitted into St. George's Hospital in September, 1810, on account of a disease in her right foot. She gave the following account of her case.

In the September of the preceding year, she wrenched her instep, and soon afterwards experienced violent pain in this part, so that she was unable to stand on the foot, and her rest was much disturbed at night. The pain continued very severe, and at the end of four months, she observed, for the first time, a slight swelling on the inside of the foot. This was occasioned by an abscess, which was opened by her medical attendant in the April following.

At the time of her admission into the hospital, the whole foot was swollen, and she complained of violent pain in it. The abscess continued open, discharging a small quantity of pus. On introducing a probe into the orifice, an exposed surface of bone was felt. Several applications were made without benefit, and the leg was amputated on the 25th of February, 1811.

On examining the amputated foot, the cartilages of the joint formed by the astragalus and os naviculare were found destroyed by ulceration, and a portion of the astragalus was dead, and undergoing the process of exfoliation. The cartilages of the joints formed by the cuneiform bones with each other, with the os naviculare, and with the metatarsal bones, were in like manner destroyed, and the exposed surfaces of

bone were carious. The abscess communicated with the carious joints. The ligaments and synovial membrane were in a natural state, except in a few spots, where they were destroyed by the abscess. The bones possessed their natural texture and hardness. The cellular membrane of the foot contained coagulable lymph and serum.

From the previous history, as well as from the appearances on dissection, there can be as little doubt in this case as in either of the two preceding, that the original disease was the ulceration of the cartilaginous surfaces, and that the other parts were affected only in a secondary manner.

It would be needless to add to the foregoing, an account of other cases, in which the disease was in a still more advanced stage. The progress of it in other joints, corresponds with that in the hip, and whatever may be the joint affected, there is ultimately the same complete destruction of the cartilages, and the same extensive ravages are committed among the bones and soft parts.

In one of the cases related in this section, where ulceration of the cartilages had begun in several other joints, those between the bodies of some of the dorsal vertebræ were very much altered from their natural structure; and this circumstance rendered it probable, that in the ordinary cases of caries of the spine, the disease has its origin in the intervertebral substance, and that it corresponds to the ulceration of the cartilage in other joints. In cases of this disease, which I have examined after death, the appearances have tended to confirm this conclusion, as I have found the destruction of the intervertebral cartilages to be greater than that of the vertebræ themselves, and the caries of the last has been either entirely confined to, or most extensive on, those surfaces, to which the cartilages had been connected. The following case, which came under the observation of Mr. Howship, and the particulars of which he communicated to me, appears to complete the evidence on this subject.

CASE XX.

Christiana Clear, a girl eight years of age, was admitted into the Infirmary of St. George's parish, in the year 1808, on account of a disease of the spine. At this time the upper part of the spine was bent forward, and the spinous processes of some of the dorsal vertebræ, formed a preternatural projection at the posterior part; but still she was able to walk without assistance.

Soon after her admission, an abscess formed and burst in the groin; and this was followed by a second which burst near the former.

The child was now forced to be confined entirely to her bed. The abscesses continued to discharge pus. She became affected with hectic fever; nevertheless more than two years elapsed, from the time of her having been first admitted into the infirmary, before she died.

On inspecting the body, it was found to be universally anasarcous. The abdominal muscles were so wasted that scarcely any vestige of them was observable. This, probably, arose from the child having remained in bed for so long a period previous to her death, and having scarcely ever varied her position.

At the posterior part of the abdomen, there was a confused mass of soft substance, which proved to be the parietes of an abscess communicating with the orifices in the groin.

The bodies of the lowest dorsal, and three superior lumbar vertebræ were found at the posterior part of the abscess, nearly consumed by the caries.

There were no remains of the intervertebral cartilage between the tenth and eleventh dorsal, nor of that between the third and fourth lumbar vertebræ. These intervertebral spaces were filled with pus, and the opposite surfaces of the vertebræ were carious, but only in a slight degree. The central part of the intervertebral cartilage, between the bodies of the ninth and tenth dorsal vertebræ, was completely absorbed, and pus

was found in its place. Externally to this abscess, the concentric layers of elastic cartilage were entire, though somewhat altered from their natural appearance.

The case just related, and the circumstances before mentioned, seem to warrant the conclusion, that, in the ordinary cases of caries of the spine, the disease is, originally, an ulceration and abscess of one or more of the intervertebral cartilages, beginning in the centre, and extending to the circumference, and afterwards affecting the bodies of the contiguous vertebræ.*

After stating these facts, it is however proper to mention, that I have examined some cases, in which the spine was carious, and in which the bodies of the vertebræ were extensively destroyed, while the intervertebral cartilages were very little, or not at all affected: but in all cases of this kind, which have come under my observation, the caries was evidently not the original affection, but the consequence of some other disease external to the spine. Thus, where an abscess has formed in the psoas muscle, or in the cellular membrane, which surrounds it, the matter resting on the vertebræ occasions caries of the bones, but not of the cartilages between them; so that in some instances, where the disease has been of long continuance, the former have been found extensively destroyed, while the latter have remained projecting, almost of their natural size.

* Mr. Pott, in his treatise on the disease of the spine, speaks of it as showing itself in a variety of forms, "sometimes in that of a thickened state of the ligaments," "sometimes in that of a distempered state of the intervertebral cartilages," "sometimes in that of diseased glands," &c. There can be no doubt that the spine is subject to many morbid affections; but I believe it will be found that the symptoms described by Mr. Pott, attended with a curvature of the spine forwards, and projection of the spinous processes backwards, are produced only by the disease described above, and that it is this disease only, which is relieved by the method of treatment which he has recommended. The lateral curvature of the spine is a different affection, being, in general, the consequence of a soft or rickety state of the bones.

In some cases, the ulceration of the cartilage of a joint begins on that surface, which is connected to the bone; and from having observed this circumstance, I was at first led to adopt an opinion which I heard stated to have been that of Mr. Hunter, and which appeared to be warranted by the small degree of vascularity which cartilage possesses, that ulceration of it takes place, not from the action of its own vessels, but in consequence of it being acted on by the vessels of the bone, to which it is connected. I afterwards found, that in many instances, previously to ulceration, the cartilage undergoes a remarkable change of texture, becoming soft, and assuming a fibrous appearance; thence I was led to conclude, that this opinion is not altogether correct; and I now am able to adduce the two following cases, which seem to prove that cartilage, as well as other parts, is capable of ulcerating from the action of its own vessels.

CASE XXI.

A boy, 12 years of age, on the 28th of June, 1809, fell from a height, and pitched on one of his knees. When he was brought to the hospital, he was found to have a compound fracture of the femur. For some days he appeared to go on well, but afterwards an abscess formed in the thigh extending as high as the nates; and he sunk and died on the 21st of July. On examining the knee joint after death, the cartilage covering the condyles of the femur, and that covering the head of the tibia was found, in some parts, entirely absorbed, so that the bone was exposed; and in other parts it was absorbed on the surface towards the cavity of the joint, while the layer of it next to the bone retained its natural adhesion, and its natural structure. The cartilage, in these parts, was formed into grooves, having an appearance as if the greater portion of its substance had been removed with a chissel.

CASE XXII.

A middle-aged man met with an injury of the knee, which was followed by inflammation and suppuration, and he died in St. George's Hospital, on the 30th of August, 1809.

On examining the joint after death, the cartilage covering the condyles of the femur, and the head of the tibia, was found entirely destroyed towards the circumference, so that the bone was exposed. Elsewhere, only a thin layer of cartilage remained; but this had its ordinary texture, and adhered as firmly as usual to the bone.

As in these cases the cartilage was absorbed on the surface towards the cavity of the joint, while the remainder still adhered to the bone, it is evident that the absorption must have taken place from the vessels of the cartilage itself.

In young persons, before the period of growth is over, the articular cartilages possess more vascularity than in others, so that their vessels are distinctly to be seen, and admit of being injected, which is not the case in adults; and this explains why the ulceration of the cartilage takes place more frequently, and makes more rapid progress in the former than in the latter.

When the disease, which has been described in this present section, has made very considerable progress, if the patient recovers so as to preserve the limb, he seldom has the use of the joint afterwards, the bones composing it being united by anchylosis; but if it has been checked in a less advanced stage, even though the whole of the cartilages have been destroyed, the patient may retain the natural motion of the joint. In these cases, I have no reason to believe that there is ever any attempt at the regeneration of the cartilage. In some instances a smooth, compact layer of bone is formed on the carious surface, nearly similar to what is seen in a healthy bone, after the cartilage is destroyed by maceration. I have many times, in dissection,

observed a considerable portion of the cartilage of a joint wanting, and in its place a thin layer of hard, compact, semi-transparent substance, having an irregular granulated surface. It is probable, that in these cases the original disease had been ulceration of the cartilage. In a subject in the dissecting room, I found no remains of cartilage on the bones of one hip, but in its place, a crust of bony matter was formed, of a compact texture, of a white colour, smooth, and having an appearance not very unlike that of marble. I suspected this also to have been a case, in which the patient had recovered after ulceration of the cartilage, and this opinion was rendered more probable by the following case which afterwards occurred.

CASE XXIII.

A woman, 36 years of age, was admitted into St. George's Hospital, with pain in the hip and knee on one side. The nates were wasted and flattened, and a large abscess had burst, leaving a sinus communicating with the hip joint. She was affected with hectic fever, and she gradually sunk and died. On inspecting the body, various sinuses were found in the neighbourhood of the hip, and communicating with it.

The synovial membrane and capsular ligament had undergone no alteration in their appearance, beyond what evidently depended on the abscess. The cartilage was every where absorbed from the articulating surfaces, and in its place, there was a white polished surface, similar to that which has been just described.

VI.—*On the Scrophulous Affection of the Joints.*

The term scrophula is often employed without much precision, and indeed it is not always easy to determine what symptoms ought, and what ought not, to be referred to this disease. It has been usual to regard nearly all the affections of joints as scrophulous, and I believe it may be found, that per-

sons having a predisposition to scrophula are, on the whole, more liable than others to those affections which form the subject of the preceding sections. As, however, they occur very frequently, where no such predisposition exists, there seem to be no sufficient grounds for considering them as having any necessary connection with it; and it can be no more proper to designate these as scrophulous, than it would be to denominate inflammation of the synovial membrane a mercurial disease, because it occasionally arises from the use of mercury. But there is another malady which affects the joints, having all the characters of scrophula; occurring only in persons having a scrophulous appearance, and usually preceded by, or combined with, other scrophulous symptoms.

In the scrophulous disease of the joints, the bones are primarily affected, in consequence of which ulceration takes place in the cartilages covering their articulating extremities. The cartilages being ulcerated, the subsequent progress of the disease is the same as where this ulceration takes place in the first instance.

CASE XXIV.

Charles Miller, twenty years of age, having blue eyes, light hair, and a fair complexion, was admitted into St. George's Hospital, in April, 1808, on account of a disease in one foot. The whole foot was swollen and œdematous, with two fistulous sinuses, one on the inside and the other on the outside, through which a small quantity of scrophulous matter was discharged. A probe being introduced into either of these sinuses, some exposed pieces of bone might be distinguished.

On the 16th of May, the limb was amputated below the knee.

On examining the amputated foot, the muscles were found pale and wasted from want of use, and the cellular membrane was distended with serum and coagulable lymph.

The extremities of the tibia and fibula, all the bones of the

tarsus, and the extremities of the bones of the metatarsus, contained much less earthy matter than is usual. They were so soft that they might be cut with a scalpel, without the edge of it being turned. They were preternaturally red and vascular, and a yellow cheesy substance was deposited in the cancelli. The cartilage at the base of the fifth metatarsal bone was destroyed by ulceration. Those at the bases of the three middle metatarsal bones were also destroyed, and the exposed surfaces of bone were dead, and undergoing the process of exfoliation. The cartilages of all the other bones were in a natural state. Pus and coagulable lymph was effused in the neighbourhood of the dead and carious bones; and the sinuses communicated with them. The synovial membrane and ligaments were in a natural state, except where destroyed by the abscesses.

CASE XXV.

John King, 26 years of age, having blue eyes, thick lips, and a florid complexion, was admitted into St. George's Hospital, on the 1st of June, 1811, on account of a complaint in his right ankle and foot. I received the following account of his case, partly from himself, and partly from a medical gentleman, who was in the habit of seeing him before he came into the hospital.

About the end of May, 1810, he wrenched his foot. The instep and ancle became swollen and painful, but in a few days these symptoms subsided. During the summer he experienced slight pain and weakness of these parts whenever he took more than his usual quantity of exercise; but in October a slight tumefaction was observed on each side of the ankle, and the pain was more severe, but still not sufficient to prevent his going about his usual occupations. About the middle of December the pain became more violent, and he was confined to the house for a fortnight; after this the pain abated, so that he was able to go about with the assistance of a crutch.

In March, 1811, an abscess burst on the outside of the foot. The formation of the abscess was not attended with any considerable degree of pain.

He formerly had been supposed to labour under incipient *phthisis pulmonalis;* but from the time of the disease having been begun in his foot, he suffered no inconvenience from the complaint in his lungs.

At the time of his admission into the hospital, there was a diffused œdematous swelling of the soft parts over the whole foot and ankle. On the outside there were the orifices of three or four sinuses, which had burst at different periods. He had very little pain, even on motion or pressure. Soon after his admission, another abscess broke on the inside of the heel. On the 11th of July, the leg was amputated.

On examining the foot, the cells of the cellular membrane were found distended with serum and coagulable lymph.

All the bones had undergone a morbid change, similar to what was observed in the last case, except that they were still softer, and more vascular. The cartilages of the ankle were completely destroyed by ulceration, and the exposed surfaces of bone were in a state of caries. The cartilages of the tarsus were entire, but, in some places, of a red colour, and this was found to arise from vessels loaded with red blood, extending into them from the bone. The ligaments and synovial membranes of the tarsal joints were in a natural state, as were also those of the ankle, except where they had been destroyed by the abscesses.

CASE XXVI.

This patient was a soldier in the Coldstream Guards; I once had an opportunity of seeing him before amputation was performed; and, through the kindness of the medical officers of the regiment, I was favoured with the previous history of the complaint, and with the opportunity of examining the amputated joint.

William Miles, twenty years of age, of a delicate complexion, with red hair and dilated pupils, was attacked with a slight pain and swelling of the left knee, about the middle of January, 1808. On keeping quiet for a few days, the swelling subsided; but it returned about the end of March, though still attended with very little pain. He was received into the hospital of the battalion at Chatham, and, on the 9th of June following, he was sent to the regimental hospital in London.

At this time the diseased knee measured in circumference three inches more than the other. Fluid was felt external to the joint, and in the cavity of the joint itself. The leg was kept extended, and all attempts to bend it gave considerable pain: but otherwise the pain which he endured was trifling, amounting only to a slight degree of uneasiness deep-seated in the joint. On the 8th of July, an abscess burst near the inner edge of the patella, and discharged about eight ounces of thin pus. On the 27th of July the limb was amputated.

On examining the knee, the articulating extremities of the tibia and fibula were found so soft that they were readily cut by a common knife: they contained much less earthy matter than is usual, and their cancelli were filled by a yellow cheesy substance.

The cartilage covering the head of the tibia was destroyed by ulceration in a few spots at the margin. That of the femur was eroded for a very small extent behind the crucial ligaments. The patella, and the cartilage covering it, were in a natural state. Coagulable lymph, having a gelatinous appearance, had been effused into the cellular membrane, on the outside of the synovial membrane. Pus was found external to the joint, and in the joint itself.

The preceding cases sufficiently illustrate the nature and progress of this disease. The morbid affection appears to have its origin in the bones, which become preternaturally vascular, and containing a less than usual quantity of earthy matter; while, at first, a transparent fluid, and afterwards a yellow cheesy substance, is deposited in their cancelli.

From the diseased bone vessels carrying red blood shoot into the cartilage, which afterwards ulcerates in spots, the ulceration beginning on that surface which is connected to the bone. The ulceration of the cartilage often proceeds very slowly. I have known a knee amputated on account of this disease, in which the cartilage was absorbed, for not more than the extent of a sixpence.

Occasionally, but not often, a portion of the carious bone dies, and exfoliates.

As the caries of the bones advances, pus is collected in the joint. At last the abscess bursts externally, having formed numerous and circuitous sinuses.

Inflammation takes place of the cellular membrane, external to the joint. Serum, and afterwards coagulable lymph, is effused, and hence arises a puffy elastic swelling in the early, and an œdematous swelling in the advanced, stage of the disease.

Scrophula attacks only those bones, or portions of bones, which have a spongy texture, as the extremities of the cylindrical bones, and the bones of the carpus and tarsus; and hence the joints become affected from their contiguity to the parts which are the original seat of the disease. I have never met with an instance of the alteration of structure, which has been just described, in the cranium, nor in the middle of the cylindrical bones.

Examples of this disease occur in almost every joint of the body, but oftener in those of the carpus and tarsus than in any other. In one instance which came under my notice, nearly all the joints of the body were affected at the same time in the same individual.

It should be observed, that in some other cases besides those of scrophulous affection, the bones are found to be more or less altered from their natural texture. When a bone is extensively carious, it appears as if the absorption of the earthy part takes place more rapidly than that of the animal matter, and hence it becomes preternaturally soft in the neighbour-

hood of the carious surface, at the same time that it assumes a dark colour and has a fœtid smell, from the lodgment of matter in the cancelli. In cases where a disease has evidently originated in the soft parts of a joint, I have occasionally found the bones to have lost much of their original hardness of texture, though the alteration has been in a much less degree than in scrophulous bones, and without the deposition of yellow cheesy substance in the cancellous structure. Some circumstances induce me to suspect that mere want of use is sufficient to occasion a deficiency in the secretion of phosphate of lime, and, indeed, the analogy of what may often be observed after a fracture, renders this highly probable. When the two broken ends of a bone have become united by callus, the callus, in some instances, does not become ossified, while the patient continues in bed, and in a state of rest; but if he moves about on crutches, and exercises the limb, the ossification is speedily produced.

The diseases which have been described in the foregoing sections are those of the most frequent occurrence. There are some other affections to which the joints are liable, but a brief notice of these will be sufficient.

1. Occasionally inflammation takes place on the articulating extremity of a bone, and an abscess forms and bursts into the joint. Where this happens, there is sometimes a fresh formation of bony matter in consequence of inflammation, and ossification of the periosteum, and this constitutes the only species of diseased joint which has come under my own observation, in which an actual enlargement of bone takes place. Where the soft parts of a joint are considerably thickened, a feeling is sometimes given to the hand, as if the bones themselves were increased in size; but my friend Mr. Lawrence, some years ago, observed and pointed out that this feeling is deceptive.

2. I have known an instance, in which, without any evident

cause, a large portion of the head of the tibia died, and exfoliated, and the destruction of the knee joint was the consequence.

3. The loose bodies, which are occasionally found in a joint, have been so frequently described by writers, that it might appear unnecessary to offer any observations on the subject. But I have met with two cases in which the loose bodies were of a different nature, and had a different origin, from those which are ordinarily met with. It not unfrequently happens, that from some morbid action, a bony ridge is formed, like a small exostosis, round the margin of the cartilaginous surfaces of the joint. In the two instances, to which I allude, this preternatural growth of bone had taken place, and in consequence of the motion of the parts on each other, portions of it had been broken off, and lay loose in the cavity of the joint.

4. The effects of gout on the joints are very remarkable. The cartilages are absorbed: the exposed surfaces of bone, are entirely, or partially, encrusted with white, earthy matter, which I conclude to be urate of soda, and sometimes they have the appearance of being formed into grooves, as if they had been worn from their friction on each other. In some cases, repeated and violent attacks of gout occasion complete anchylosis.

I am induced to hope, that the foregoing observations will be found to lay the foundation of a better arrangement of the diseases of joints, than that which has usually been adopted: but I am well aware that the subject is by no means exhausted. I shall endeavour to avail myself of such opportunities as may occur of prosecuting the investigation further; and, in the mean time, I beg the indulgence of the Society for not having already rendered it more perfect. The study of pathology is indeed attended with peculiar difficulties. There is no science in which a greater number and variety of facts demand our notice; none in which a just and accurate knowledge of facts

is less easy to be obtained; or in which the phenomena are so little capable of being reduced to general laws. A multitude of causes, too minute to be detected, silently operate, sometimes to modify and alter the effects of the same morbid action; at other times, to give a similar form and character to different diseases. Particular periods and particular climates produce their own peculiar maladies; and hence, the labours of those who have gone before us, or who have made their observations in other countries, are often of little service towards promoting the researches in which we ourselves may be engaged. All these circumstances render it impossible to bring pathology to that degree of perfection, which has been attained in some other branches of knowledge; but the difficulty of the science does not render it less important to human nature, nor less necessary to be pursued by those engaged in the medical profession.

Account of a Family having Hands and Feet with supernumerary Fingers and Toes. By Anthony Carlisle, Esq. F. R. S.

[From the Transactions of the Royal Society of London.]

Zerah Colburn, a native of the township of Cabot, in the state of Vermont, in North America, has been lately brought to London, and publicly exhibited for his extraordinary powers in arithmetical computations from memory. This boy has a supernumerary little finger growing from the outside of the metacarpus of each hand, and a supernumerary little toe upon the outside of the metatarsus of each foot. These extra fingers and extra toes are all completely formed, having each of them three perfect phalanges with the ordinary joints, and well-shaped nails.

Abiah Colburn, the father of Zerah, has five fingers and a

thumb upon each hand, and six toes on each foot; he has also five metacarpal bones in each hand, and six metatarsal bones in each foot. The extra limbs have distinct flexor and extensor tendons.

The wife of Abiah Colburn has no peculiarity in her limbs. During the existing marriage she has borne eight children, six sons, and two daughters. Four of those sons inherit the peculiarity of their father more or less complete, while the two daughters are free from the family mark, as well as two of the sons, namely, the fourth in succession, who was a twin, and the eighth.

The eldest son of these parents, named Green Colburn, has only five toes on one of his feet, but the other foot and both his hands possess the extra limb.

The second child, Betsy Colburn, is naturally formed.

The third, Zebina Colburn, has five fingers and á thumb upon each hand, and six toes upon each foot.

The fourth and fifth were twin brothers, and named David and Jonathan; David, who is dead, had nothing of the father's mark, but Jonathan has the peculiarity complete.

The sixth, Zerah Colburn, the extraordinary calculating boy, is marked like his father, as before described.

The seventh, Mary Colburn, is naturally formed.

The eighth and last child, Enos Colburn, is also exempt from the father's peculiarity.

Besides the persons I have mentioned, this hereditary redundance of limbs has been attached to the little fingers and to the little toes of several of the ancestors of the family. The mother of Abiah Colburn brought the peculiarity into his family. Her maiden name was Abigail Green; she however had not the extra finger on one of her hands; the other hand and her feet were similarly marked with those of her son Abiah.

David Colburn, the father of Abiah, had no peculiarity. By his marriage with Abigail Green he had three sons and one daughter. Two of these sons and the daughter were fully

marked in all the limbs; the other son had one hand and one foot naturally formed.

Abigail Green inherited these supernumerary limbs from her mother, whose maiden name was —— Kendall, and she had five fingers and a thumb upon each hand, and six toes on each foot.

The marriage of —— Kendall with Mr. —— Green produced eleven children, whom Abiah Colburn's mother, who was one of the eleven, reports to have been all completely marked; but the present family are unacquainted with the history of the other ten branches, and they do not possess any knowledge of their ancestors beyond —— Kendall, the great grandmother of Zerah Colburn.

Numerous examples of the hereditary propagation of peculiarities have been recorded; all family resemblances, indeed, however trifling they may appear to a common observer, are interesting to the physiologist, and equally curious; though not so rare as those described in the preceding history. In every department of animal nature accumulation of facts must always be desirable, that more reasonable inductions may be established concerning the laws which direct this interesting part of creation: and it might be attended with the most important consequences if discovery could be made of the relative influence of the male and female sex in the propagation of peculiarities, and the course and extent of hereditary character could be ascertained, both as it affects the human race in their moral and physical capacities, and as it governs the creatures which are subdued for civilized uses. Nor is it altogether vain to expect that more profound views and more applicable facts await the researches of men, who have as yet only begun to explore this branch of natural history, by subjecting it to physical rules.

Though the causes which govern the production of organic monstrosities, or which direct the hereditary continuance of them, may for ever remain unknown, it still seems desirable to ascertain the variety of those deviations, and to mark the

course they take, where they branch out anew, and where they terminate. There is doubtless a general system in even the errors of nature, as is abundantly evinced by the regular series of monstrosity exhibited both in animals and vegetables.

It has happened, in my professional capacity, that I have had to extirpate a supernumerary thumb from each of the hands of two girls, who were both idiots, though the families to whom they belonged were unknown to each other. I have seen many instances of supernumerary thumbs and supernumerary fingers in persons to whom the singularity was not hereditary, and I have read of many others; but whether of my own experience, or of authentic record, the redundancy has been on the outer side of the little finger, and outer side of the thumb, never on the back or inside of the hand, or on the sides of the intermediate fingers; and in similar cases as to the toes, the rule has been invariably the same. In the Sacred Writings an example of this kind is given, 2 Samuel, ch. xxi. ver. 20, "And there was yet a battle in Gath, where was a man of great stature, that had on every hand six fingers, and on every foot six toes, four-and-twenty in number; and he also was born to the giant." The same account is repeated in 1 Chronicles, ch. xx. ver. 6.

In the Elementa Physiologiæ of Baron Haller, numerous examples of this deformity are cited from various authors, with some instances of their hereditary descent, and others of a cutaneous junction between the extra limbs and the next adjoining.

That local resemblances, such as those of external parts, the hands, the feet, the nose, the ears, and the eye-brows, are hereditary, is well known; and it is almost equally evident, that some parts of the internal structure are in like manner transmitted by propagation; we frequently see a family form of the legs and joints, which gives a peculiar gait, and a family character of the shoulders, both of which are derived from an hereditary similarity in the skeletons. Family voices

are also very common, and are ascribable to a similar cause. Apparently many of our English surnames have been taken from the hereditary peculiarities of families, and the same practice existed among the Romans. Pliny in his eleventh book, chap. xliii. relates an instance of a Roman poet, named Volcatius, who had six fingers on each hand, and received the surname of Sedigitus in consequence. He also states, that two daughters of a noble Roman, named M. Curiatius, had each six fingers, and that they took the surname of Sedigitæ. Persons who had the surname of Flaccus were so called from their pendulous ears; and numerous other instances are recorded by classic writers, of surnames being derived from family marks.

Anatomical researches have not been so generally extended as to determine the prevalence of internal peculiarities, and perhaps they do not reach to the sanguineous system. I have known two instances, in two different families, of the high division of the brachial arteries having the ulnar branch placed above the fascia of the biceps muscle at the inner bend of the elbows, and yet the father, the mother, the brothers and sisters of those two persons were not so formed. Those marks called nævi materni, which are derangements of the sanguineous vessels, are not hereditary, whilst less remarkable changes in the ordinary skin are often so. I have lately seen a man, and who is now living, who has a small pendulous fold attached to the skin of his upper eyelid, and the same peculiarity has been transmitted to his four children. It would have been interesting to know whether any similarity of structure existed in the families of the two rare examples of a total transposition of the abdominal and thoracic viscera. (Phil. Trans. for 1674, No. cvii. p. 164, by Dr. Sampson, and vol. lxxviii. p. 350.)

In particular breeds of animals the characteristic signs are generally continued, whether they belong to the horns of kine, the fleeces of sheep, the proportions of horses, the extensive varieties of dogs, or the ears of swine. In China the varieties

of gold or silver fishes are carefully propagated, and with us, what are vulgarly called "fancy pigeons" are bred into most whimsical deviations from their parent stock.

As wild animals and plants are not liable to the same variations, and as all the variations seem to increase with the degree of artificial restraint imposed, and as certain animals become adapted by extraordinary changes to extraordinary conditions, it may still be expected that some leading fact will eventually furnish a clue by which organic varieties may be better explained. A few generations of wild rabbits, or of pheasants, under the influences of confinement, break their natural colours, and leave the fur and feathers of their future progeny uncertainly variegated. The very remarkable changes of the colour of the fur of the hare, and of the feathers of the partridge, in high northern latitudes, during the prevalence of the snow, and the adaptation of that change of colour to their better security, are coincidences out of the course of chance, and not easily explained by our present state of physical knowledge.

The Volcano of Albay.

For the following very interesting account of a late eruption of the Volcano of Albay, the editors of the New York Commercial Advertiser are indebted to the politeness of captain Bailey, of the schooner Cintra, who arrived on Monday, April 3d, 1815, in 110 days from Manilla. This volcanic mountain is situated in the province of Camarines, on the southern part of the Island of Lucon, or Luconia, one of the Philippine Isles in the Indian Ocean.

Five populous towns were entirely destroyed by the eruption; more than twelve hundred of the inhabitants perished

amidst the ruins; and the twenty thousand who survived the awful catastrophe, were stript of their possessions and reduced to beggary.

Dreadful and memorable occurrence, that took place in the Province of Camarines, on the 1st day of February, 1814.

[Extracted from a Pamphlet in the Spanish language, printed at Manilla.]

More than thirteen years had elapsed, during which the volcano of Albay, by some called Mayon, had preserved a continued and profound silence, without giving the least sign of its existence. It was no longer viewed with that distrust and horror with which volcanoes usually inspire those who inhabit their vicinity. In the year eighteen hundred its last eruptions took place, in which it emitted a great quantity of stones, sand and ashes, (as had always been usual) and occasioned considerable damage to the same villages that it has now completely destroyed; rendering useless a great number of fertile fields, which thenceforth were converted into arid and frightful sands. In the latter part of October of that year, the last eruption happened, and caused more damage to those villages.

Since that time we had not remarked any circumstance indicative of the existence of the volcano, and therefore all the apprehension that it had formerly inspired was gradually dissipating.

In this state was the volcano on the first day of February last. No person reflected, in the slightest degree, upon the damages and losses that so bad a neighbour had been in the habit of occasioning. We had become persuaded, in consequence of so long a silence, that it was now completely extinguished, and that all those subterraneous conduits were closed, through which it attracted to itself and kindled the combustible materials which it had formerly so continually thrown out. Nor had we seen or remarked any signs which might indicate to us before hand what was about to take place. In

the former eruptions, there were heard, a considerable time previous, certain subterraneous sounds, that were sure presages of them. It also emitted, almost continually, a thick smoke, by which it announced them. But upon the present occasion we remarked nothing of all this. It is true, that on the last day of January we perceived some slight shocks; but we scarcely noticed them, on account of their having been very frequent, since the earthquake that we experienced on the fifth of October of the year eighteen hundred and eleven. On Monday night the shocks increased. At two in the morning we felt one more violent than those we had hitherto experienced. It was repeated at four, and from that hour they were almost continual until the eruption commenced.

Tuesday dawned, and I scarcely ever remarked at Camarines, a more serene and pleasant morning or a clearer sky. I observed, however, that the ridges nearest to the volcano were covered with a mist, which I supposed to be the smoke of some house thereabouts, that had been on fire in the night. At eight o'clock, on that fatal morning, the volcano began suddenly to emit a thick column of stones, sand and ashes, which, with the greatest velocity, was elevated in a moment to the highest part of the atmosphere. At this sight we were astonished, and filled with the utmost dread, and especially when we observed, that in an instant, the brow of the volcano was covered by it. We had never seen a similar eruption, and were immediately convinced that a river of fire was coming towards us, and was about to consume us. The swiftness with which that dreadful tide rolled towards us, did not us give much time either for reflection or conversation. The frightful noise that the volcano made, caused great terror, even in the stoutest hearts. We all ran terrified, and filled with the greatest dismay and consternation, endeavouring to reach the highest and most distant places, in order to preserve ourselves from so imminent a danger. The horizon began to darken, and our anxieties redoubled.—The noise of the volcano continually increases; the darkness augments; and

we continue our flight for the preservation of our lives, removing farther and farther from an object so terrific. But notwithstanding the swiftness with which we run, we are overtaken in our disastrous flight by a heavy shower of huge stones, by the violence of which many unfortunate persons are in a moment deprived of life. This unforeseen and cruel circumstance, obliges us to make a pause in our career, and to shelter ourselves under the houses; but flames and burnt stones fall from above, which in a short time reduce them to ashes.

The horrid and frightful noise of the volcano increases to its utmost—the shower of stones and thick sand augments—the burning stones and meteors continue to fall; and in a very short time reduce to ashes the most beautiful villages of the province of Camarines. The animals of the mountain descend precipitately to the villages, to seek in them a secure asylum. The domestic animals run terrified with the greatest disorder and affright, uttering cries that indicate their approaching end.

At about ten in the forenoon it ceased to rain heavy stones, and each one endeavoured to remain in the situation he then was, waiting until the rain of thick sand which succeeded it should also cease, or until some new and unforeseen calamity should terminate the existence of us all.

We thus continued until half past one in the afternoon; at which hour the noise of the volcano began to diminish, and the horizon to clear a little; at sight of which there was revived in us the hope of life, which until then had been almost wholly extinguished. At about two in the afternoon it became entirely clear, and we began to perceive distinctly the lamentable and dreadful ravages that the darkness had hitherto concealed from us. We saw with terror the ground covered with dead bodies, part of whom had been killed by the stones, and the others consumed by the fire. Two hundred of those perished in the church of Budiao—thirty-five in a single house in that village. The joy that all felt at having preserved life through such imminent dangers, was, in many, instantly

converted into the extremity of sorrow at finding themselves deprived of their relations, friends and acquaintances.

The sad result of the misfortunes of that day has been the total ruin of five villages, in the province of Camarines, and the principal part of Albay—the death of more than twelve hundred unfortunate persons, and many others severely wounded—the loss of every thing that the survivors possessed in the world.

The present appearance of the volcano is most melancholy and terrific. Its side, which was formerly so cultivated, and which afforded a prospect the most picturesque, is now nothing but an arid and barren sand. The stones, sand and ashes which cover it are so astonishing in quantity, that in some places they exceed the thickness of ten and twelve yards; and in the very spot where lately stood the village of Budiao, there are places in which the cocoa trees are almost covered. In the ruined villages, and almost through the whole extent of the eruption, the ground remains covered with sand to the depth of half a yard, and scarcely a single tree is left alive. The crater of the volcano has lowered, as I judge, more than twenty fathoms, and on the south side discovers a spacious and horrid mouth which it is frightful to look at. Three new ones are opened at a considerable distance from the principal crater, through which also smoke and ashes were incessantly emitted. In short, the most beautiful villages of Camarines and the principal part of that province are converted into a barren sand.

ORIGINAL PAPERS.

FOR THE ECLECTIC REPERTORY.

Memoir, exhibiting a very simple method of perceiving objects formed at the back part of the Eye. Translated from the French of M. MAGENDIE, D. M. P., by N. C. NANCREDE, M. D. &c. &c.

THE formation of images at the back part of the eye is not to be explained from a knowledge of the structure of the eye and of the laws of dioptrics alone; philosophers demonstrate their formation by direct experiments also.

For this purpose Schreiner, Hook, Camper, Lecat and others, sometimes employed artificial eyes, composed of glass and water. The results obtained by these gentlemen were in a degree, satisfactory; i. e. they saw images, tolerably well formed, on that part of the glass representing the retina. The dissimilarity which necessarily exists between such instruments and the eye of an animal, has caused them to be entirely abandoned: at least I do not know that any philosopher makes use of them at present.

A method better known, and now the only one in use, consists in fixing, in the shutter of a dark room, the eye of an animal; the precaution having been taken to deprive its posterior part of the sclerotica and choroid. The images of objects placed so as to emit rays towards the pupil, are then very distinctly seen on the retina. In these experiments the eyes of bulls, sheep, dogs, cats, and even human eyes, have been employed.

When this method is adopted, in order to ensure complete success, it is necessary, 1st. That the eye be very fresh, or in other words, that the animal, whence the eye has been obtained, should have expired within a very few moments: 2d. That the retina be found sound, when the sclerotica and choroid have been taken off: 3d. That the shape of the eye

be not altered: and it is no easy matter to unite these several conditions.

We may easily procure eyes, from the animals abovementioned, at the very moment of their death, but the difficulty does not solely rest here; the sclerotica and choroid must be taken away without injuring the retina; this is attended with considerable difficulty; and when, by a great deal of care, we have succeeded in preserving the retina unimpaired, we must remember that the shape of the eye must not be altered; this is almost impossible, for the least pressure on an eye, previously deprived of the sclerotica and choroid, or even the simple collapse, is sufficient to occasion the rupture of the retina, or the displacement of a portion of vitreous humour, which unavoidably occasions an alteration of the shape of the organ of sight.

The measures generally resorted to, to prevent this inconvenience, such as putting the eyes in a small cup made of pasteboard (coque de Carton) to direct the reflection of the image on a piece of oiled paper, taking from the eye only the sclerotica, &c. are far from fulfilling the intention; nay, they often do more harm than good.

If the operator were to take off these coats only twenty-four hours after the animal's death, he would experience much less difficulty, because they have then lost by evaporation a portion of their humours; he would also obviate one of the great difficulties attendant on the experiment: but on the other hand, the refractive parts of the eye are altered, the crystalline lens has lost a part of its transparency, and the aqueous humour having dissolved part of the pigmentum nigrum, has become turbid, and admits only of an imperfect transmission of the rays of light.

To these great difficulties we must attribute, that the experiment is so very seldom tried, and still less attended with the desired result.

If in what I have just stated I have expressed myself clearly, it will appear evident, that the opacity of the sclerotica

and choroid, is the only obstacle to the success of this experiment; since it is the opacity of these coats, which makes their removal necessary.—Easy indeed would the experiment become, if we could operate upon eyes, whose exterior membranes were transparent to a certain degree: thus permitting us to see the images formed on the retina.

Chance has thrown in my way an opportunity of remarking, that the eyes of many domestic animals possess this advantage; for instance rabbits, guinea-pigs, young dogs, kittens, and pigeons; and this becomes the more apparent as the animals are younger. The eyes of owls and other nocturnal birds of prey, present a similar structure. If these birds were more frequently to be met with, and if their eyes resembled more those of the mammiferæ, by their size and degree of transparency of their exterior membranes, perhaps they ought to be preferred to those of the animals enumerated above. However, we have only to take the eye of one of the above-mentioned animals, to separate the sclerotica from the fat and surrounding muscles, and to direct the pupil towards illuminated objects; the images will be then seen distinctly represented through the sclerotica and choroid on the retina. As the experiment succeeds without the dark room, it is unnecessary to have recourse to it.

Thus this important experiment, which required a great deal of precaution and skill, and which could be repeated only by a very small number of persons, can henceforth be performed by any one, and without fear of failure.

I will however add, that when recourse is had to this mode, images are distinct only where the objects are very bright. The image of an object is much better seen, when the object is exposed to the sun, than when it is placed in the shade. I shall also state, that the black matter with which the choroid is covered, prevents the distinguishing, perfectly, the genuine colours of the image; for instance, the image of a flame of a taper appears to have a reddish tinge, which, in reality, it does not possess.

I sought, for some time, the means of obviating this inconvenience. It finally struck me, that among the species, the eyes of which I had employed, there were some that were albinos. It is well known that one of the characteristic marks of this abasement of animals, is the absence of the coloured coat of the choroid and iris.

I examined the eyes of white rabbits and albinos pigeons: I was much gratified to find, that they were in the most favourable condition. The sclerotica is thin and nearly transparent; the choroid is likewise thin, and as soon as the vital spark is extinguished in the animal, the blood which coloured this part disappearing, it becomes incapable of offering any sensible obstacle to the passage of light. Indeed the eyes of these animals appear to have been formed for the express purpose of showing the images that form on the retina. The outline is well defined, and all the colours distinctly perceived; and so perfectly are they represented, that the image of the sun hurts the eyes of the examiner, almost as much as if he were in reality viewing this planet.

A very convenient mode of making the experiment, consists in placing yourself at the window of the first story, during a fine day; to direct the transparent cornea of a large white rabbit towards the street: every person that passes, is then represented on the retina, by an image of about a *millimètre** in height; the colour of the dress and the slightest

* The new French measures proceed in a decimal order; for instance, the millimêtre is the tenth part of the cêntimêtre; the latter is the tenth part of the decimêtre, the decimêtre is the tenth part of the mêtre, and so on. The numbers which are annexed to the following names of the French measures, express the number of English inches, or troy grains to which they are equivalent.

Millimêtre - - - - - - - -	0,039371
Cêntimêtre - - - - - - - -	0,39371
Decimêtre - - - - - - - -	3,9371
Mêtre - - - - - - - -	9,371

The mêtre is equal to the forty millionth part of the whole circumference of the earth.

motions of the individual, are represented with such surprising accuracy, that the spectator is at once amused and astonished.

The facility with which images are beheld by this method, has enabled me to make some remarks, and suggested some experiments; I will in a few words say something of both.

On a fresh eye, images always appear clearly defined and their size increased, on the object being brought closer; and their diminution by its being removed farther off has no effect upon their clearness. If we were to rely upon the first view, we should be led into the belief, that the eye is a perfect acromatic instrument.

I wished to determine what would be the effect of a circular pressure, made perpendicularly to the axis of the eye, from behind forwards, near the middle of this organ: I found, that whatever be the degree to which it is carried, the effects are not to be discovered in the dimensions of the image. If it has any influence, I presume it is perceived by the intensity of the light; at least it appeared to me, that the intensity of the light was greater after the pressure.

It must not be thought, that a deficiency in the clearness of the outlines of the image, cannot be detected at first sight; it is only necessary to make a small opening in the transparent cornea, with a point of a lancet, near to its circumference, so as to occasion the exit of a small portion of aqueous humour, as it thus becomes very apparent that the image has lost its clearness.

I afterwards sought to ascertain the rule, by which the image decreases in consequence of the increased distance of the object; I found that the size of the image is visibly proportioned to the distances. Mr. Biot was kind enough to assist me in ascertaining this; in other respects it corresponds with what has been published by Mr. Lecat in his Treatise on Sensations.

What alteration would take place in the form and dimen-

sions of the image, if the refracting parts of the eye were removed? This could only be ascertained by experiments.

I made a small opening at the circumference of the transparent cornea, near its union with the sclerotica, and contrived so that the aqueous humour should escape through it. The image (it was that of the flame of a taper) appeared to me, *cæteris paribus*, to occupy a larger space on the retina; it was evidently not so well defined and less bright, as the image of the same object seen in the eye of the other animal, which I had just placed in the same position, with respect to the taper, but which had been preserved entire, in order that it might serve as a comparison.

Depriving afterwards the eye, from which I had extracted the aqueous humour, of the transparent cornea, by means of an incision made circularly at its junction with the sclerotica, the image did not appear to me to have altered its dimensions; but I thought that the light which formed it had lost much of its brilliancy.

This, as well as the preceding fact, become conspicuous, when the object, the image of which we examine, is situated at a considerable distance, five or six mêtres for instance.

An eye, from which the transparent cornea has been taken, presents the iris naked; it is then easy to enlarge the pupil, by means of a circular incision in the substance of the iris. And upon an eye whose pupil I had thus enlarged, it appeared to me that the image had increased by the very act of enlargement.

If we take the anterior lamella of the capsula of the crystalline lens, with all due precaution, from an eye whose transparent cornea has been removed, the image is surrounded by a circle of light, less bright and irregular at its circumference.

When we extract the crystalline lens, by a process similar to that of the operation of the cataract, the image is always formed at the bottom of the eye. But it has become considerably larger; and is at least four times the size of the image,

produced in an entire eye: It is besides imperfectly defined, and the light which produces it, very dull.

When, from the same eye, we take the aqueous humour, and the crystalline lens, and only leave, of the interior parts of the eye, the vitreous humour and the crystalline capsule, images are no longer seen formed at the bottom of the eye; light, it is true, penetrates, but causes no image to be represented correspondent with that from which it is reflected.

I have thus enumerated the small number of facts, which the facility with which images may be seen formed on the expansion of the optic nerve, has enabled me to ascertain: the greater part correspond with the theory of vision: some however form exceptions. To the philosopher it appertains to decide whether these last merit any degree of attention.

Case of a Wound of the Knee Joint.

BY DR. WILLIAM WATSON.

Hay Market, Prince William County, Va. July 4th, 1814.

To the Editors of the Eclectic Repertory,

GENTLEMEN,

THE following case was communicated to me, by Doctor William Watson, of Bedford, Pennsylvania, a physician of great respectability; and thinking it might be of practical importance to the public, I obtained his consent to publish it, with such remarks on it as I might think proper to make. These are few, and accompany the report of the case, both of which you will please to publish, if they should appear worthy of a place in the Eclectic Repertory,

And oblige

THOMAS P. HEREFORD.

"*February 15th*, 1814.

"A stout, rugged, hardy fellow, of five and forty, had inflicted a very narrow wound on his knee, but which had penetrated the capsular ligament, in the hollow near the patella. He had but little pain, and continued to hew with his broad ax, (the instrument which had caused the wound,) for two or three days longer, till inflammation and pain commenced, with synovial discharge; the night after which he was seized with severe spasms extending up the large muscles of the thigh, which laid hold of the xiphoid cartilage and jerked it back towards the spine with great force. Under these circumstances I first saw him. I expected the immediate appearance of tetanus. The knee was very hot and inflamed, but his pulse was very obscure. I was much tempted to bleed him ad deliquium animi, according to the successful treatment of hydrophobia, but finally determined on the plan of mercury and opium; the opium soon induced intoxication, which was kept up for forty-eight hours, during which time the spasms disappeared; a large saturnine poultice was also applied to the knee. After this time the spasms were confined to the knee and its neighbourhood, but without pain, excepting in one point about two inches below the joint, without the smallest symptoms of inflammation. The pain in this part was intolerable, particularly at night. The swelling diminished in the joint, and with the use of anodyne liniments, and sedative or astringent poultices, the pain in a degree subsided for some weeks. It then returned in the same point; the knee swelled, the veins became turgid, and all the phenomena of white swelling of the joint were assumed, except that pain remained in the point mentioned below the joint, which was entirely free from pain. There was little general fever; the pain was excruciating; he screamed day and night; no external application would give him the slightest relief. Large quantities of laudanum alone gave temporary ease; but even these began to fail. He had slept none for sixteen days and nights; his leg

and foot became œdematous. The sensibility was extreme; touch him in any part and he was instantly all in motion, except his leg and knee, which nothing would induce him to move, and which he would suffer none to touch. He begged me to amputate the limb. But I still thought I could relieve him by mercury, and waited several days for a more tranquil period, in which the general system might be more obedient to the mercurial excitement. At the time mentioned, his pulse, instead of beating like a small cord, became more open. I then gave the mercury freely internally, and immersed the whole leg and foot in strong mercurial ointment. The mercury now soon brought the system under its influence; the excitement perceptible in the arteries; but no swelling of the gums, mouth or throat. The pain instantaneously left him. The swelling gradually disappeared. The mercury was continued for two weeks, at the end of which time I had him out of bed; and the flexor muscles of the leg are now regaining their elastic power.—I know not whether this case is very singular; I had one before somewhat similar, which I believe I communicated to you. You will ask why did I not bleed? After the use of the mercury and opium in the first instance, there was a peculiarity of pulse and countenance which deterred me. Something which I cannot describe, but which from experience had proved, that bleeding would not remove. Possibly, had I bled at first, much pain and labour might have been saved, and a safe period for the exhibition of mercury might have been presented. I have had few late publications, and am so much out of the way of the practice of others, that I know whether there is any thing new to you in this case; if not, take the design of being useful in place of the usefulness."

Yours truly,

WILLIAM WATSON.

Dr. Thomas P. Hereford.

REMARKS.

THE treatment of this case strongly exemplifies the power which mercury possesses to alter and control the morbid condition of the living human system: and whilst we witness its effects, we lament that we know so little of its modus operandi. Many learned and ingenious opinions have been advanced on the subject, but not one adventurer has been so fortunate as to elucidate the mystery. Though thus much, with no small share of satisfaction, we acknowledge to know of mercury, that, with its ordinary properties, it possesses a peculiar stimulant and alterative one; and that it is by this quality that it exerts a specific power in regulating and controlling the living actions of the human body. In the case before us there appears to have been something pathognomonic in many of the symptoms, and it certainly was a very desperate one. I am led to suppose that nothing but the severe local pain and morbid sensibility of the organ of touch prevented it from assuming all the symptoms of tetanus. I am also much disposed to believe that bloodletting would have been highly important in it had it preceded, or even accompanied the use of mercury; particularly if the man had been bled ad deliquium animi: For in such cases, the bloodvessels being robbed of their due excitement by the muscles and nerves, bleeding sparingly would probably do little or no good; as it requires, to take off excess of nervous and muscular excitement and consequent irritability of the muscles, that the whole system should be thrown suddenly into a state of relaxation by copious bloodletting. At this period the bloodvessels seem to draw upon the nerves and muscles for excitement, and thereby lessen and interrupt the morbid associations of the general system. This then affords a favourable opportunity for the introduction of mercury; it now much more readily imparts its stimulus to the system, and extinguishes morbid action, by establishing its own proper and specific excitement. But as

this patient lost no blood, I presume the remedy had to conflict with morbid excitement for a longer period before it could predominate. The topical application of the ung. merc. in the liberal manner in which it was used, must have been judicious and useful, uniting emollient with alterative virtues. I never employed it in similar affections but once, when it was attended with very happy consequences; and it was upon the authority of my friend Dr. Watson that I then resorted to it. I also gave mercurials freely internally, and bled the patient copiously. The mercury quickly produced a ptyalitic effect, the symptoms yielded, but the patient recovered the use of the limb very slowly, notwithstanding the mercurial excitement was supported during the convalescence.

Although I have in these remarks supposed that venesection would have been a valuable auxiliary in the treatment of Dr. Watson's patient, I feel myself free to say that I am not confident thereof. Perhaps that indescribable something, which he has allusion to, derived from experience, and which was the result of personal observations made by a man, whose mind is at once cool, sober, discerning and apt; never rash and impetuous, but bold where boldness is required, and cautious when caution is necessary, may have well directed him in the management of the case; in fact the result has proved it, for if the advances towards the cure were not so rapid as I have supposed they might have been through the agency of the lancet, they were patient, ingenious, firm and successful. My design has been to draw the attention of the public to a remedy which I consider a sine qua non in most of those violent spasmodic affections arising from injuries of the joints; it seems to be too much confined to the diseases of the blood-vessels, and too seldom addressed to affections of the muscles from the action of local irritants.

FOR THE ECLECTIC REPERTORY.

Description of a Sick-Bed, proposed by JOHN RHEA BARTON, *of the Pennsylvania Hospital.*

THE conveniencies of a sick-bed, and the disadvantages of the common kind, in the treatment of many medical and surgical cases, are already too well known to require any repetition. All that seems necessary here, is to state one or two of the principal objections to Earle's bed, as an apology for the construction of another for similar purposes. These are, that its great expense and complicated structure appear to prevent its use, except in a very few instances; and that the patient always requires at least two persons to assist him.

As the bed-stead and mattress, to be hereafter described, are more simple than the former, and the expense amounts only to about one third of it, and the patient is able to assist himself, merely by turning a crank at the side of his bed, if it possesses no greater advantages, it may seem worthy of some notice.

In this bed, a broad board is substituted for a sacking bottom. In the centre of this board is a circular perforation, the diameter of which is about nine inches; on the under-side are placed longitudinally two cleets, distant from each other twelve inches, and including the hole; between these cleets is placed a kind of lid, the width of which is twelve inches and the length sixteen, and is hung by two hinges at its upper extremity, or that nearest the head of the bedstead, in such a manner that it comes directly under the hole in the board; at its lower extremity is attached a clamp or cross piece which projects on each side about an inch. Another piece is made precisely similar to the lid, except that instead of being suspended by hinges, it is made to slide between the cleets, and in the centre a hole is made to correspond with that in the broad board.

The slider and lid are attached to each other by means of an iron bar, twenty-three inches long, on each side, running from the cross piece of one to that of the other. A roller is placed behind the lid, about six inches from the hinges; the diameter of this roller is four inches, and its length twenty-two, exclusive of its axis at each end, one of which projects beyond the side of the bedstead, and has a crank or windlass affixed to it. From the cross piece of the lid to the roller passes a rope on each side, which is confined along the cleets by two pullies, one immediately behind the cross piece and the other just before the roller; and from the middle of the cross piece passes another rope to be attached to the middle of the roller, where its diameter is reduced to about one half.

The ropes on the sides wind in one and the same way, whilst that in the middle goes in the opposite direction, so that as the two side ropes are wound up, the middle one is unwound, and vice versa. When therefore the roller is turned in one direction, the side ropes relax and the middle one becomes tense, thereby drawing the lid down; and as the slider is attached to the lid by the iron bars, and is at the same time confined between the cleets, it can only slide along them, by which means the hole in the slider comes directly under that in the board.

A pan is attached to the slider, by three small cleets which confine its brim around the margin of the hole.

The mattress differs from the common ones, only in being perforated in the centre to correspond with the broad board, and having tapes at each corner to tie around the bed-posts. A cushion is tacked to the lid, so that when kept up it fills the vacancy in the mattress.

In the sheet which covers the mattress, a crucial section is made and its corners turned back.

Fig. 1.

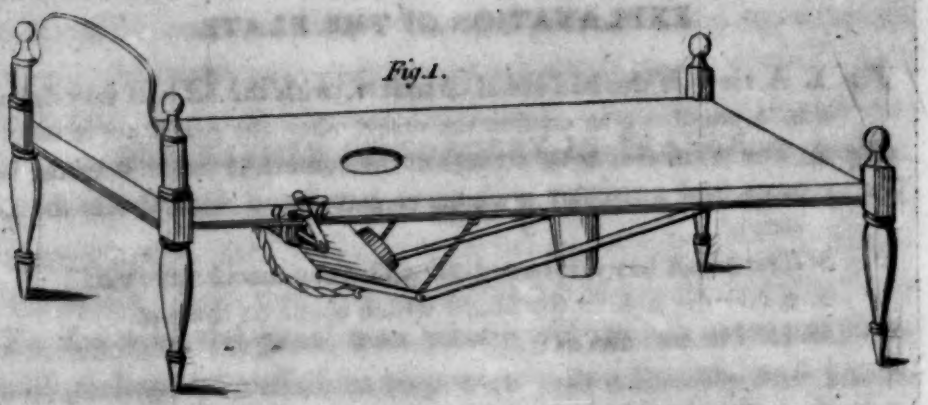


Fig. 2.

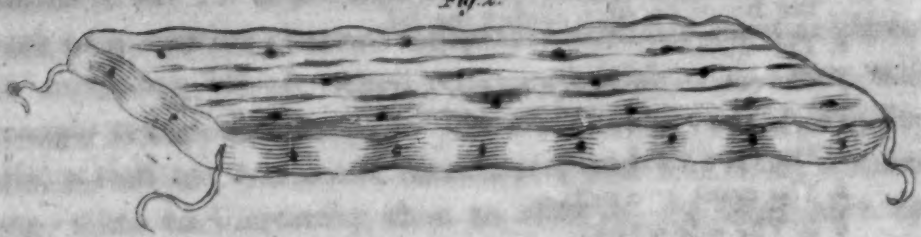


Fig. 3.

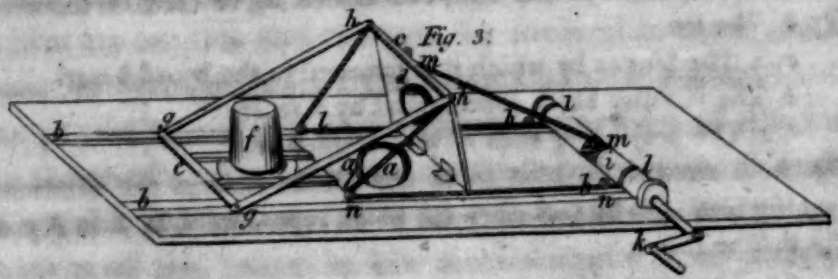


Fig. 4.

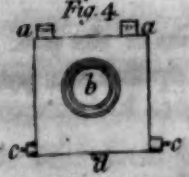


Fig. 5.

Fig. 6.

Fig. 7.

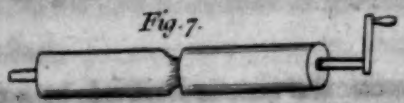
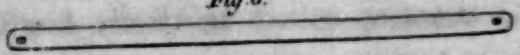


Fig. 8.



W.P.C. Barton. del.

EXPLANATION OF THE PLATE.

Fig. 1. A view of the bed-stead complete, with the lid half way down.
a. a. A small peg to confine the crank when the pan is not in use.

Fig. 2. The mattress, with strings at the corners to fasten it to the bed-posts, and a circular opening to correspond with that in the bed-stead.*

Fig. 3. The broad board inverted to exhibit the machinery: viz.
a. A circular hole in the board which opens on the pan.
bb. bb. The two cleets.
c. The lid.
d. A circular block, answering in size and thickness to the hole in the broad board, nailed to the lid.
e. The slider.
f. The pot, which should be made of tin.
gh. gh. The iron bars.
i. The cylindrical roller.
k. The crank or windlass.
ll. ll. The side ropes.
m m. The middle rope.
n n. The pullies on one side, two answering to them on the other.

Fig. 4. The lid.
a. a. The hinges by which it is fastened to the broad board.
b. The circular block represented by *d.* in *Fig.* 3.
c. c. The projecting ends of the cross piece.

Fig. 5. A circular cushion to fit and fill the hole in the mattress, and which is to be tacked to the block represented by *b.* in *Fig.* 4.

Fig. 6. The slider.
a.a. The cross piece.
b.b.b. Three small cleets to confine the brim of the pan.
c. A hole through which a pin is put to confine the pot more completely.

Fig. 7. The roller and crank.

Fig. 8. One of the iron bars; the other being like it.

* The opening in the mattress is omitted, by a mistake of the engraver.

ELOGE OF AMBROSE PARE',

THE FATHER OF SURGERY IN FRANCE;

BY DR. VIMONT.

[From the London Monthly Magazine, for October 1814.]

To describe the great man whose eulogy we now propose, it will perhaps be sufficient to present, on a limited scale, such actions of his life as are best calculated to exhibit the groundwork of his native character, together with his most celebrated inventions; which, when compared with each other, will strongly reflect the image of his mind. Thus neglecting details, which are too often inaccurate, and which besides belong rather to biography than to science, we shall take up Paré, when yielding to his destiny and carried away by his taste for study, and the exercise of an art which expected from him its revival and renown, he arrived in the capital of France, the best theatre for the talents of such a man.

The physiological and philosophical principles of Paré are nearly those of Galen and the Arabian physicians. Vesalius was his guide in anatomy. The sketch which he has given of the system of the latter in his works contains all that was known at that period, with respect to that most essential basis of surgery, and every thing of importance then known in the treatment of diseases and the performance of surgical operations. We find him following the doctrine of Hippocrates in every thing relative to tumours in general, and wounds of the head in particular.

At the outset of his career he perceived that, circumscribed within the confined circle of faulty processes and limited to defective and sometimes barbarous modes of operating, surgery marched by the uncertain and deceitful light of erroneous principles, which, transmitted by the Greeks and Arabs, had been adopted almost without restriction down to the six-

teenth century. His judicious and fertile mind never became acquainted with an evil but he sought to remedy it. From that moment the restoration of surgery was decreed; measuring the immense space which separated him from the object he proposed to attain, and never concealing from himself the difficulties of every kind which attended the execution of such a vast project, sustained by a genius of still greater extent, and particularly by the noble and praise-worthy ambition of being useful to humanity, Paré was anxious to raise to the art of surgery a durable monument, founded upon the most correct traditional knowledge, and upon the facts collected during his own fortunate and extensive practice of half a century.

The valuable materials which, during this period, experience and observation had collected around him, Paré would not give to the world, until, as he informs us, he had consulted several excellent men, "physicians as well as surgeons, who encouraged him to pass beyond even the proposed end of his career."

In his writings, which are full of candour and goodness of heart, Paré never lets an opportunity escape of paying to the ancients the tribute of esteem which they deserve. Every where he speaks of the respect which is due to the first inventors of the art: "So far as it was possible," he says, "I have never suffered that the treasures of the good fathers should be kept secret." He also observes, with his usual good sense, that, notwithstanding the important discoveries for which we are indebted to antiquity, it cannot be denied that surgery, like all the experimental sciences, daily enriching itself with facts, ought necessarily to reckon upon time and observation for increasing its resources and perfecting its methods: "that, moreover, it is unpardonable negligence to stop at the invention of our ancestors, imitating them merely after the example of the idle, without adding to and increasing the inheritance which they have left us."

If we wish properly to appreciate the immense services

which the healing art has received from Paré, let us cast an eye upon the state of surgery, at the period when he first entered upon his career.

"Roger, Roland, Bruno, Guillaume de Salicet, Lanfranc, Gorden, Guy de Chauliac, confined themselves to commentaries on the Arabs, and had reduced surgery to the use of ointments and plaisters."*

Thus the Arabians and their followers only rivalled the prejudices, and multiplied the errors, which, transmitted from age to age, received the sanction of time and of the authority of some masters. Abandoned to the most despicable empiricism, surgery then was confined to machinery clumsily contrived, if the reduction of a luxated or fractured limb was required; and emplastra of every kind, consisting of strange and incongruous mixtures of contradictory substances, if solutions of continuity of soft parts, of whatever nature, were to be treated.

Whatever of the useful part of surgery had been preserved by tradition, was either despised or mistaken. No trace was perceptible of that philosophic spirit which, wisely desirous of discoveries, incessantly seeks after truth, and in a series of uninterrupted combined efforts, tends to rise above the darkness of ignorance, and to triumph over the seductions of error. Surgery, then more barbarous than the age itself, bursts the fetters of prejudice and authority. It was particularly in the treatment of gunshot wounds, that the most stupid routine seemed destined, as it were, to increase the horrors of war; and, if among the victims of the field, and this murderous routine, some men were so fortunate as to escape the dreadful accidents thus occasioned, they purchased their lives at the expense of frightful mutilations and deformities.

It cannot be denied, that the discoveries which do the greatest honour to human genius have been primitively owing to chance, or rather have been revealed by Providence.

* Richerand. Nosographie Chirurgicale, Hist. de l'Art.

Paré is forced to confess that chance was his first master in the treatment of gunshot wounds. Employed at first in the army of Piedmont, he relates, that his practice did not differ from that which had been previously followed. The boiling oil which he was pouring over the wounds having fallen short, he was obliged, with regret, to substitute a very mild digestive. Fear kept him awake the whole of the night. Young, and under the influence of the prejudices of his masters, he expected to find that all those had perished who had not undergone the cruel unction. It was not without astonishment, mixed with pleasure, that he saw quite the reverse had happened. His genius effected the rest.

It belonged to the restorer of surgery to elucidate the treatment of gunshot wounds, by dissipating the prejudices which so long kept back this branch of surgery, by substituting, for the most absurd theory, and the most barbarous processes of blind empiricism, rational ideas, and curative methods, as simple as they were efficacious.

Ignorance, always inattentive, and perceiving no relation between gunshot wounds, considered relative to their external appearances, and the serious accidents with which they are complicated, found it quite natural to ascribe all these effects to the pretended poison of gunpowder, as well as to the cauterizing property of the various projectiles.

Opinions so false, and the dangerous consequences which necessarily resulted from their application to practice, could not fail to strike the mind of Paré in a forcible manner: in a discourse which he addresses to Charles the Ninth, on the occasion of the death of the king of Navarre, who was wounded at the siege of Rouen, he exposes, like an expert physiologist, the mode of action and the various effects of round bodies, and other projectiles, upon the various systems of the animal economy: he demonstrates, that the black colour which marks their passage and their too frequent unfortunate termination, results, 1. From the excessive contusion and laceration of soft parts; 2. From the violent commotion experienced by the

wounded limbs; 3. From the stupor which supervenes, dissipating and sometimes extinguishing the natural heat, whereby gangrene and mortification of the part, if not of the whole body, is brought on.

Thus mouldered away the ridiculous theory of gunshot wounds, adopted by Fevy, Botal, Vigo, &c. previous to the time of Paré. Thus vanished forever the frightful apparatus employed by men who supposed that gunpowder was of a venomous nature, and that balls and bullets became inflamed in their course, so as to cauterize all soft bodies with which they came in contact.

It belongs only to real genius to unite profundity of ideas with strength and precision of style. When genius, embracing the whole of a subject at one grasp, penetrates into all its elements, comparing and generalizing, the mind of a common stamp, scarcely dipping into the matter under discussion, abandons things themselves to attend to the futile arrangement of words, and speedily, far from the traces of good principles, it wanders in the ocean of false hypotheses. What has been the result of such fruitless efforts? Some valuable ideas have been buried under the weight of insipid volumes.

Paré on the contrary has left us but a few pages on gunshot wounds; but nevertheless we may affirm, without fear of contradiction, that, with the exception of some superannuated pharmaceutical preparations, they are full of sage and luminous precepts, well calculated to guide even the modern practitioner in his knowledge and treatment of this description of wounds.

When we compare the doctrine of Paré with all that was previously practised with respect to gunshot wounds, and with the slowness with which the healing art has since advanced, his transcendant merit will appear still more striking. But nothing has escaped his observation. Does he treat of simple or compound solutions of continuity in the bones? His precepts exhibit the consummate skill of the most expert practitioner. In a fracture compounded with laceration, is it necessary to

ascertain the position and state of the parts in general? It is to the fingers alone that he entrusts this office; for he observes, the sense of touch is more certain than any instrument. Will it be believed that this mode of proceeding, dictated by good sense, and supported by experience and the laws of nature, has been called in question? In fact, the probing of wounds with instruments, whatever is their direction, extent, or situation, has passed into one of these routine customs, which but too generally prevail over truth and reason.

From the sublimest eminences of the art, Paré disdains not to descend to the humblest details, persuaded that nothing ought to be overlooked in a profession which has the life and health of mankind under its care; and that a process which was trifling or useless in other hands, may produce the happiest results when resorted to by an enlightened surgeon. In this way Paré regards the art of dressing wounds as a medium, not only for exhibiting manual dexterity, but for bringing into play delicacy of tact and fertility of talent, besides paving the way for a completion of the cure.

After being himself exposed to the formidable concomitants of a compound fracture of the leg, Paré informs us, in the faithful details which he has left behind him, with what scrupulous attention he meditated upon the means of preventing and curing such accidents as may result from such a misfortune. Alluding to the excruciating pain, insupportable heat, and general uneasiness which the patient experiences, he observed, and all attentive practitioners have since observed, that all these concomitants necessarily result from the permanent position in which the body must be placed in fractures of the lower extremities; thus he remarks, that the patient is wonderfully relieved, if from time to time the position of the fractured limb is changed, so as to refresh it by renewing the circumambient air, and momentarily relieving it from the pressure to which the fractured parts are liable. To express this renovation of the air, Paré invented the word *flabellation*, as opposing itself to the progress of inflammation.

But let us return to the accident which befel himself; here again his genius and true heroism did wonders; and here he deduced from his own misfortune precepts highly useful to the advancement of science and the good of mankind. We find him opposing an admirable *sang froid* to the accessions of pain, arming a stranger's hand with the scalpel, guiding him with one hand, and with the other tracing the road through which to come at the splinters, many of which, separated from the periosteum and entangled in the soft parts, were to be methodically extracted; and, after having done all that talent and patient courage could do, leaving to future generations a model to be followed in the treatment of compound fractures.

His Treatise on Luxations, encumbered as it is with the multifarious machinery peculiar to the age in which he lived, nevertheless exhibits the profundity of his ideas. What practitioner is ignorant, for instance, that the luxation of the external extremity was mistaken until the time of Paré, and that the fracture of the neck of the femur was confounded with the luxation in that bone? We need not dwell upon the awful consequences which previously resulted from these blunders.

What he says of the dislocation of the humerus, and the processes for remedying it, evidently proves that he knew the influence of muscular action in reductions. Here again he was truly original, and has laid the foundation of all future improvements in this departmen of surgery.

May we not say as much for the section of the artery between the ligatures in the operation for aneurism, according to the method generally attributed to Hunter? Is not the following passage, in the works of the French surgeon, an answer to the discussions which have taken place on this subject? "Above all I advise the young surgeon to avoid opening aneurisms if they are not very small, and in parts not dangerous, cutting the skin above, separating it from the artery; then we may pass a seton needle with a strong thread under the artery at both sides of the wound; then should the said

artery be tied and cut, and the wound treated like a simple wound, letting the thread fall away of itself."

Before the time of Paré lesions of arteries were almost always followed by death, unless when nature got the better of the accident, and of the routine, by suspending the hæmorrhage of herself. In these days boiling oil and the actual cautery held the first rank in the means with which the art of surgery met such formidable accidents.

Endowed with a fertile spirit of invention, Paré was the first to propose the rejection of these cruel and barbarous operations for stopping the hæmorrhage from a wounded artery. His two celebrated ligatures are too well known to require a description; suffice it to say, that, according to M. Louis, the eulogist of the French school of surgery, Paré has proved that no description of accident to which the ligature can be applied had escaped the penetration of that great man.

Like all eminently useful discoveries, the ligature of the arteries was at first most violently opposed. Attacked at once by bad faith, ignorance, and envy, Paré might have safely appealed to experience in answer to his antagonist. But such was the simplicity of his heart that he set about to justify his valuable discovery by numerous quotations from the ancients, or rather he struggled to strip himself of his greatest title to future glory!

If the opposition to his invention had come from physicians alone, such as Gourmelen, we should have ascribed it to ignorance of the art of surgery, or to that shameful spirit of personal rivalry, which too often retards the progress of real knowledge; but who can restrain their indignation on hearing that the celebrated Fabricii, whose works are still consulted as the oracles of surgery, were the enemies and detractors of Paré?

But such is the logic of the passions, and such the force of prejudice, that nothing will ever be considered good until it has ceased to be our interest to call it bad. Can we be astonished then that the medico-chirurgical sciences have so long

slumbered, when we see one of the most important discoveries with which they have been enriched, attacked with a kind of furor as inefficacious and even dangerous; and, in spite of the sanctions of authority and experience, exposed to all the shiftings of opinion both in the country of the author and abroad? Ought it not to move our indignation to see this salutary discovery pass through nearly two centuries without irrevocably fixing the ideas of the profession, and making even but a slight impression in the most brilliant æras of our history?

Will it be believed, in short, that surgeons of the last century*, yielding to the influence of routine, and perhaps to the taste for controversy, which still subsisted, instead of bringing to perfection the ingenious process of the good Ambrose Paré, have blindly declared against the ligature in favour of the actual cautery, burnt alum, vitriolic acid, compression, and finally the agaric of the oak? This is to prefer error to truth, darkness to light; and, in combating the hydra of Lerna, to arm ourselves with the distaff of Omphale instead of the club of Hercules.

But it is cheering to observe that one of our greatest masters of the art of surgery, the immortal Desault, reproduced and practised two centuries afterwards the immediate ligature recommended by Paré. This homage is worth a thousand eulogies on the genius of the inventor!

And but for Ambrose Paré, how many warriors would have sunk prematurely into the tomb, without having it in their power to animate the heroic chivalry of youth by exhortations to defend their religion, their prince, and their country, and to excite to deeds of loyalty and valour, even by the exhibition of their mangled bodies and mutilated limbs!

In the diseases of the eye the glory of Ambrose Paré is without a rival. An inveterate ophthalmia, refractory to the various means employed by art and empiricism, had caused

* Vide in particular the Memoires de l'Acad. tom. 2, p. 394.

almost total blindness to an Italian jeweller. Taught by experience that there existed sympathetic relations between the eye and the posterior part of the neck, and that great advantages must result from an artificial ulcer in the nape of the neck in some diseases of the eye, the illustrious Paré proposed a seton; the patient consented, and soon afterward he recovered the use of sight.

Among the numerous morbid affections to which the eye is liable, the various degrees of opacity of the crystalline are among the most frequent: this lenticular body, when injured in its interior organization, or merely in the slight membranous texture which surrounds it, will present an insurmountable obstacle to the rays of light, until an expert hand, directed by an exact acquaintance with the constituent parts of the eye, operates the extraction or removal of the offensive substance. In this case, the hope of recovering the eye-sight, or rather the cure of the cataract, invariably rests with those two modes of operating, whatever may be the name or number of the instruments which the operator chooses. Of the above two processes, that of removal, which was well known to the ancients, alone occupied the attention of Paré.

When genius cannot create, it perfects. Ambrose Paré received from the ancients the method of operating upon cataract by depression, but he enriched it with a most important addition, the neglect of which may render the operation fruitless.

The depression of cataract is operated by two movements; one serves for the depression of the crystalline, and the other sinks it into the vitreous body, beyond the optic axis, in order to prevent its re-ascension. Paré describes this operative process in the following way:—"And, being depressed, it must be let alone, keeping it under the needle while we can say a Pater-noster, lest it should reascend and push up the diseased eye."

One of the most illustrious and expert practitioners of Europe, Professor Scarpa, that distinguished partisan of the

depression of the opaque crystalline, judiciously remarks, on this occasion, that Paré's advice is of the most indispensable importance.

It happens that, in transverse and deep wounds of the neck, the larynx and tracheal artery are divided, when the air escapes by the wound, and the voice is lost. Ambrose Paré relates that a gentleman inflicted upon himself this kind of wound; his servant was suspected, and sent to prison. When called to the assistance of the wounded man, Paré thought of immediately sewing the head to the neck, in order to bring together the edges of this dreadful wound. By these means the patient, although exhausted by the effusion of blood, recovered the use of speech, confessed his own act, and acquitted his domestic from the charges brought against him. The patient died: but Paré, by bringing together the divided edges of the tongue, showed what might be done by similar enterprise.

At the commencement of the eighteenth century, the obstetrical art was enriched with the forceps, a new instrument; but Ambrose Paré gave the idea, and the celebrated Levret and Palpin have confessed it.

Of all the cutaneous diseases, erysipelas is, perhaps, the most formidable; because its etiology and generative principle are the most difficult to discover, and it is rebellious against all the succours of art.

A person came from the country to Paris to implore the aid of Paré, so dreadfully disfigured with erysipelas, that the people, regarding him as a leper, had forbidden him to enter the church. In this case Paré had recourse to blisters, applied upon the sores themselves, with the view of changing the mode of irritation, in order to determine a specific inflammation of the cutaneous surface, which having been long fretted and encumbered by the erysipelas, had gradually lost its elasticity. It is scarcely necessary to add, that the patient was finally restored to health and to society.

Here a regard to justice, rather than to the glory of the re-

storer of surgery, compels us to remark, that, if several eminent surgeons of modern times, such as Richter, Bloch, Evers, and others, have resorted to blistering in obstinate erysipelas, they have omitted to mention the great man who originated the practice. Those who object to the simplicity of this application, have forgotten that it is the province of genius alone to be simple in its means, and fertile in its results: a reflection equally applicable to the kind of suture added by Desault to the instruments which he invented for the ligature of polypi, and which was first described by Paré.

The life of Paré, rich in facts, and strewed with various events, is like a brilliant parterre, in which the gifts of Flora dispute our regards and our love. There is, however, one memorable trait in his life, which demands our attention and our just eulogiums.

Ye vain and frivolous men, who, bent beneath the weight of an useless existence, seek to hide your nonentity, by directing injurious sarcasms against the ministers of health, open the annals of our history, read those pages which detail the disasters of France when assailed by an ambitious monarch; who, joining stratagem to force, was too often the successful rival, and sometimes even the conqueror of our kings.

Charles V. in person, besieged Metz with an army of 120,000 combatants. Seconded by the courage and heroic constancy of the inhabitants, under the command of a chief as valiant as he was skilful, a handful of brave men had sworn to die at the post of honour. But it was in vain that the soldiers enquired for the good Ambrose Paré: they demanded their friend, their comforter, the surgeon whose dexterous hand had so often stopped the effusion of their blood on the field of battle. "Send us Paré," they exclaimed with the accents of despair. Noble defenders of your country, calm your fears, your cries have reached the ear of the king, and the wish of his brave soldiers is accomplished. Orders are given, the proper measures are taken, and, thanks to the infidelity of an officer of the enemy, Paré was introduced into the place. His arrival

was hailed as a blessing from heaven. Paré arrives, Paré is in the town, and he shows himself at the breach! Soldiers and generals all press around him, and lavish upon him the expressions of the most tender regard. If they happen to be wounded, they no longer fear death; Paré is in the midst of them, his presence electrifies all hearts, generates a noble enthusiasm and a generous devotion. The enemy's army is wasted away before Metz, and the bulwark of France is preserved.

Let us cite another noble trait, which will not disparage the above: it is worthy of the great man who was constantly himself, i. e. the experienced surgeon, the loyal subject, and always superior to fortune.

Besieged by a numerous army, and reduced to the last extremities, Hesdin opened its gates to the enemy. Paré was then in the place. Being made prisoner by the Spaniards, his first thought was to disguise himself, and thus, at once, to disappoint their avaricious views for his ransom, and restore himself to the service of his prince and his country. He relates the dangers to which he was exposed with his usual candour. Actuated by motives of humanity, he offered his services to Signior Martigues, a Spanish officer, to dress a gunshot wound which had penetrated into the cavity of the thorax. Being compelled to explain himself as to the severity of the wound, and the curative means which he had employed, Paré, like a good anatomist and experienced practitioner, predicted that the patient would soon die. The event justified his prognostic. The opening of the body, which he never undertook except upon the most urgent solicitations, convinced the assistants with how much precision and justice he had indicated the course of the lacerating body, the name and nature of the parts wounded, and the seat of the consecutive accidents, which had rapidly brought on the fatal catastrophe.

Such a display of talent ought to have revealed to the emperor's physicians, that it could be no other than Ambrose Paré who now stood before them in the garb of misery. They

were not, as it happened, endowed with so much penetration; but, recognizing, in the medical attendant of Signior Martigues, an expert operator, at their instigation the Duke of Savoy, who commanded the Spanish army, offered him an appointment; but he nobly answered that he never would serve under a foreign prince. Happily for him, another officer of the enemy's army requested and obtained permission to employ him in the cure of a varicose ulcer in the leg, the progress of which had been attempted to be arrested in vain. After an attentive examination of this obstinate disease, after having fixed upon the causes, the nature, and complications, he established a simple and methodical plan of cure. This was by means of compression, and the moderns have added nothing to the process which Paré then adopted.

Paré obtained his liberty as the reward of his skill, and the patient was restored to health.

For many centuries it has been remarked, that to err is the lot of humanity; and this maxim has been proved even by the disputes of the most illustrious men.

Paré, contrary to the doctrine of Pineau, had denied the possibility of the separation of the bones of the pelvis in difficult labours: a disjunction slowly prepared by natural laws, which a multiplicity of facts have now placed among the number of practical facts. Paré united talents and candour, he ascertained and confessed that he was mistaken. What he has left upon this subject is dictated by that noble spirit of frankness which leaves no cause for triumph to his adversary.

Born amidst those days of trouble and misfortunes, when Christians, divided in opinions, massacred each other in the name of the God of Peace and Good Will; Paré seemed destined to witness the perpetuation, in a rapid succession of kings unworthy of the throne, of weakness, versatility, fanaticism, and corruption. What did it signify to religious fanatics if Paré was the prince of surgery, the ornament of his age, and the benefactor of humanity? He was born a Calvinist, and he followed the religion of his fathers. This was enough—it was resolved that he should die.

He escaped the massacre of St. Bartholomew by a perfect miracle: owing his safety to the gratitude, or rather to the selfishness, of Charles IX., whose life he had once saved, and who had no confidence in any other surgeon.

At this disastrous period, when fanaticism lighted up the fire of civil war in France, the plague, that formidable weapon of vengeance in the hands of Providence, exercised its ravages, and filled up the cup of misery to our afflicted country. Driven from city to city by this destructive scourge, Charles IX. at length consulted the oracle of surgery as to the best method of stopping its career. Paré obeyed his majesty's commands, by publishing a clear and methodical work, being the result of his observation and experience; and the exactitude of his details may be the more relied on, as, during the three years of his being surgeon to the Hotel-Dieu, he attended a number of individuals of every age and sex, and he was himself seized with this dreadful malady.

Sustained by sincere and unaffected piety, of which his life was a perfect model, and by a courageous zeal which never gave way to any sense of personal danger, when the welfare of another was at stake, Paré shut himself up in that sacred asylum, which religion and humanity keep constantly open for diseased indigence. Here, in this domicile of disease and death, he was seen to exert all the faculties of his soul, and all the resources of his art; and once more he turned the lessons of misfortunes to the advantage of mankind.

Good from instinct, and virtuous without effort, never was the purity of his morals called in question: it may be said, in short, that he breathed in an atmosphere of kindness. His soul was poured forth in his consolatory discourses. He was, in short, the good man described in the holy writings, "whose heart was a continual feast unto him." Piety crowned all his other virtues, and made him always regard the sovereign Author of all things, as the only object towards whose glory all his thoughts and labours ought to tend. Paré, sincerely religious as he was in this respect, exhibited a striking resemblance to the sage of Cos.

It was impossible that the union of so much virtue, talent, and success, should not raise Paré to a high degree of consideration. Envy and malice raised their shafts against him it is true; but, in spite of the ebullition of human passions, he had the glorious satisfaction to witness the commencement of his immortality. Time and experience, the supreme judges of opinions, made his doctrines be received as oracles, and his precepts became the fundamental laws of the surgical art.

All were compelled to resemble Paré, all hastened to embrace his doctrines, not always perhaps because they thought them the best, but because they were popular with prince and people. They at length saw in Paré, not only the restorer of surgery, but a man of a superior order: at the same time that the prodigies which his useful talents gave birth to every day, conquered for him the esteem of the court and of the city, the qualities of his mind also conciliated the love and veneration of the army and of the nation at large.

Such is the double influence of the rare union of talents with virtue! The admiration which this great man inspired, never diminished the respectful attachment and mild confidence which a good and sensible man never fails to inspire.

Recommended as much by the virtues as by the success of their author, shining with every kind of merit, honoured by the suffrages of the learned of all countries, the works of Paré became the archives of good surgery: he could not certainly receive a better eulogy, or a more gratifying recompense. Happy would it have been for mankind if his labours had always been the objects of meditation and respect.

Deprived of the great man who had raised her to the dignity of an art and science, Surgery was still mourning over the tomb of her beloved Paré, when she was menaced with a new misfortune—that of falling back into the night of chaos! The sight of the rich inheritance which he left had softened the bitterness of her grief: she flattered herself that the valuable legacies of her restorer, which his successors had hailed with marks of respect and gratitude, would have been the

source of new prosperity. Unfortunately these expectations were not realized, and it is but too true, that, after the death of Paré, as is well observed by professor Richerand, the surgical art made a retrograde movement.

Paré was at once too virtuous and too superior to his age, not to be frequently the butt of calumny and envy. But, if he had to contend against unjust adversaries, to repel the continued assaults of ignorance, prejudice, and calumny, how ample were his grounds of consolation in the flattering suffrages of confidence and attachment which were heaped upon him by his countrymen of all ranks. Raised to that degree of consideration and celebrity, beyond which the most ambitious man could not have aspired; he was nevertheless assiduous in the performance of the duties of his painful and honourable profession. Although attached by his title and functions to the person of his sovereign, he was nevertheless the friend of the humblest individual in the army, or in his country at large; or rather he was the friend of civil and military surgery at large.

Foreigners envied France the possession of such a man, and frequently required the aid of his talents, which he never refused. Mons and many other famous cities were indebted to him for prolonging the days of many of their wounded heroes; and, in the midst of their public rejoicings, have loudly proclaimed their grateful recollection of the name of Paré. So true it is, that men, eminent for splendid talents and active benevolence, are born less for the ornament than for the real happiness of the world.

Ambrose Paré found in his own genius the means of restoring, and perhaps of creating, surgery; and, in his good and sensible mind, an instinctive benevolence, an irresistible desire for diffusing it, and a zeal indefatigable, which knew no bounds but those which moral and physical limits prescribe. His frank, noble, and generous heart, his just and firm mind, his inexhaustible good nature, are depicted in his works, which attract, doubly, from their real merit, and from the

charms which they derive from the simple and concise language in which they are written.

Manes of Ambrose Paré, be pleased to regard with satisfaction this learned and illustrious assembly! If ye are sensible to the accents of admiration, respect and gratitude, receive the public and solemn homage of to-day! Deign to smile upon our efforts, after two centuries, to revivify the titles of your glory and of your immortality!

MEDICAL AND PHILOSOPHICAL INTELLIGENCE.

The emperor Napoleon having offered a prize to the medical schools of Paris, for the best account of the nature and cure of Croup, M. Double has obtained it for a dissertation, in which, in *catarrhal croup*, he recommends repeated emetics, particularly ipecacuanha, for the purpose of giving an increased degree of sensibility to the trachea, to assist in the expulsion of the mucous and membranous concretions. Stimulant liniments and blisters to the neck and other parts of the body, dry cupping and irritating clysters, he used to answer the same purpose. Carbonate of ammonia and of potash he also found serviceable. Calomel, he says, would be an excellent remedy in this species, because it is a moderate stimulant of the lymphatic system and mucous membranes, if its action was not too slow to counteract the rapid progress of the disease. Seneka root is also of some utility in this species of the disease only, from its irritating action. Bleeding, he says, is injurious. He found sulphuret of potash to succeed in the cases in which he has given it a trial. Bleeding, general and by leeches, is the appropriate mode of combating *the inflammatory croup*. Refrigerants, as nitre and simple oxymel, and gentle laxatives, internally, with emollient poultices and fomentations to the throat, should be used. Emetics do no good. In *nervous croup*, M. Double enumerates the whole class of antispasmodics, assafœtida, musk, camphor, opium, æther, castor, hemlock, amber, oxyde of lime, &c. Some cases have appeared to derive much benefit from the liberal use of milk. As M. Double before recommended stimulant liniments to increase the irritability of the trachea, &c. so he would now employ them to take off the spasm of the same parts. The inhalation of vapour, medicated with æther, opium, or cicuta, and pediluvia rendered a little irritating by the addition of mustard, are also said to be serviceable.—*Lond. Monthly Mag.*

M. Deschamps, an agriculturist and botanist of Lausanne, has announced to the Society of Agriculture, Natural History, and useful Arts, of Lyons, some interesting experiments on the culture of the tea plant of Japan, and which convinces him that it will succeed perfectly well in Europe, if care be taken to sow it in a proper soil and climate. M. Deschamps, accompanied his paper with directions to gather and prepare the plant for use. Having analysed it, he discovered that it contained neither tannin nor gallic acid, principles which common tea contains, and to which is ascribed the property of affecting the nerves, and occasioning tremulous sensations. The disagreeable taste which some persons find in the tea of Japan, has also been corrected by M. Deschamps, by throwing boiling-hot water over the leaves, pouring it off in two or three minutes, and then infusing them in boiling water in the usual way.—*Lond. Monthly Mag.*

On Thursday, 26th May, 1814, a paper, by Sir Everard Home, bart. on the effect of different Injuries in the Brain upon Sensation, was read before the Royal Society. The attempts to determine the functions of the different parts of the brain not having been attended with success, Sir Everard conceives that it would promote the advancement of physiology if medical men were to collect together, and arrange the effects produced by different diseases or injuries of the brain. The present paper contains the result of his own practice. It is divided into ten sections. 1. On the effect of water accumulated in the ventricles. Water accumulated in the ventricles, even to the amount of six and a half ale pints, does not destroy the faculties, provided the bones of the cranium be not united, and the head enlarged according to the accumulation. A curious case was related of a young man whose head had increased enormously, and who retained his faculties entire, except some inconveniences from the size and weight of the head. He was in his nineteenth year, and the head was thirty-three inches in circumference. When the bones of the

cranium, being united, prevent the head from enlarging, the accumulation of water in the ventricles destroys the faculties, and produces idiotism and death. 2. On the effects of concussion. It occasions nausea and vomiting, giddiness and apoplectic fits, which return at intervals for some time. 3. On the enlargement of the blood vessels of the brain. It occasions violent headaches, watchfulness, and disorders of the bowels. The beating of the arteries of the brain has been supposed essential to the exertion of the senses; but John Hunter retained his senses after the heart had apparently ceased to beat. 4. On the extravasation of blood. It produces similar effects as the accumulation of water; coma, nausea, apoplexy. 5. On the effects of the formation of pus. It occasions melancholy, lowness of spirits, and mania, with incessant talking. 6. On the effects of external pressure. The depression of the scull occasions loss of memory, the incapacity of using the proper conversation, &c. all which disappear when the cause is removed. 7. Internal pressure from tubercles produces similar effects. 8. Hydatids in the brain occasion bowel complaints, and a comatose state of the rectum and bladder. 9. Wounds in the brain occasion no symptom whatever, nor the destruction of any of the faculties. When a fungous excrescence of the brain takes place through a hole in the scull, the œsophagus becomes so sensible as to prevent the swallowing of solids, from the pain which they occasion. 10. Injuries of the spinal marrow in the neck, occasion paralysis of all the parts of the body below the injury.

An account of the diuretic powers of the *Pyrola umbellata* of North America, was read at the last meeting of the Medico Chirurgical Society. This plant has been long since used by the Indians, in cases supposed to arise from defective secretion of urine, and promises to be a valuable acquisition to the materia medica. It has the property of increasing the appetite, and has been found serviceable in some cases of dropsy.

We understand a case of the successful treatment of trismus, has lately occured at the Westminster Hospital. A robust young man was brought in with his jaw firmly locked, in consequence, as was supposed, of the bite of a dog, between the finger and thumb. It was resolved to try the effect of copious bloodletting. He was bled from the arm till he fainted, which was evidently followed by a relaxation of the jaw. Next day he was cupped behind the ears, and upon the back, till the same effect took place. The jaw now opened almost half an inch, and he was enabled to take some nourishment, but the contraction returned towards evening. The third day he was again bled from the arm *ad deliquium*. The disease was now so far removed, that he was able to make a hearty dinner of boiled salmon, and drink some porter. Hearing some conversation about bleeding him the next day, to which he was always very averse, having no sense of his danger, he left the hospital without leave. It is known, however, that he perfectly recovered, and is now quite well. He lost in all about sixty ounces of blood. The only medicine he took was a grain of tartarized antimony with two grains of opium each night at bed-time. Though this may not be considered as a very decided case of that species of trismus which has almost invariably proved fatal, it at least affords encouragement to give the same remedy a more full trial than it has hitherto experienced.

Dr. Whitredge informs one of the editors of the New England Journal of Medicine and Surgery, that he performed the operation of tying up the external iliac artery for an aneurism in the groin, at Sacket's Harbour, on the 8th of January, and that the appearances of the patient promised a successful event.

We trust Dr. Whitredge, will favour the public with a minute account of this very interesting case.

UNIVERSITY OF PENNSYLVANIA.

LIST OF MEDICAL GRADUATES, APRIL, 1815.

Pennsylvania.

1. Mordecai Morgan, ... on the Influence of derangements in the functions of the Liver, &c.
2. Peter Reubel, ... on the Modus Operandi of Medicines.
3. Joseph Coates, ... on Typhus Fever.
4. William P. Palmer, . . . on the Polygala Senega.
5. Isaac C. Snowden, ... on Mania a Potû.
6. J. Horwitz, ... on Colic.
7. Edward P. Willams, . . . on the causes of Sudden Death.
8. George Uhler, ... on the cure of Hæmorrhage.
9. Anthony Benezet, ... on the Conium Maculatum.

Maryland.

1. John H. Thomas, ... on the development of some of the functions of Life.
2. George Frick, ... on the Meloe Vesicatorius.
3. John Gwinn, ... on the Fœtal Circulation.
4. John G. Purnel, ... on the Pothos Putorii.

District of Columbia.

1. Nicholas Worthington, . . on Tetanus.
2. Edward B. Addison, . . . on Dysentery.

Virginia.

1. Joshua Smith, ... on the comparative merits of Mercury, &c.
2. Gustavus A. Brown, . . . on Dysentery.
3. James H. Conway, . . . on Arsenic.
4. William A. Patterson, . . on the Suppression of Hæmorrhage.
5. William Minton, ... on Nephritis.
6. William Hereford, . . . on Digitalis.
7. Jesse A. Bonner, ... on Cynanche Trachealis.
8. William Boswell, ... on the Prunus Serotina.
9. Patrick Macaulay, ... on Emetics.
10. Daniel W. Norton, . . . on Typhus Fever.
11. John Y. Stockdell, . . . on the Mercurial Disease.
12. Nathaniel L. Holland, . . on Apoplexy.

Virginia.

13. William A. Dupuy, . . . on Enteritis.
14. John M. Wells, ... on Bathing.
15. William Owen, ... on the Mercurial Disease.
16. Thomas G. Peachy, . . . on Uterine Hæmorrhage.
17. John H. Wallace, . . . on Rheumatism.
18. Nathaniel C. Whitehead, . on the Influence of the Passions, &c.
19. Paul C. Venable, ... on Antimony.
20. Robert L. Baldwin, . . . on the Puerperal Fever.

North Carolina.

1. David E. Jiggitts, ... on Dysentery.
2. Alexander Long, ... on Hydrocele.

South Carolina.

1. Thomas W. Roper, . . . on the Aneurism of the Aorta.

Georgia.

1. William C. Daniel, . . . on the Structure of the Placenta, &c.
2. Benjamin A. White, . . . on Inflammation.

New Orleans.

1. John O. B. Lawrence, . . . on the Fracture of the Thigh Bone.

Kentucky.

1. William Short, ... on the Juniperus Sabina.

New Jersey.

1. Charles Swing, ... on Asthma.

Connecticut.

1. Edward Barton, ... on Fistula in Ano.

Officers of the American Philosophical Society.

President.

Caspar Wistar.

Vice-Presidents.

Robert Patterson, Benjamin Smith Barton,
Jonathan Williams.

Secretaries.

Thomas C. James, Thomas T. Hewson,
Robert M. Paterson, Nathaniel Chapman.

Counsellors for three years.

Nicholas Collin, William Tilghman,
Andrew Ellicott, William Meredith.

Counsellors for two years.

Thomas Cooper, James Gibson,
Edward Pennington, Robert Hare.

Counsellors for one year.

William White, Peter S. Duponceau,
Jonathan Williams, Horace Binney.

Curators.

Zaccheus Collins, Joseph Cloud,
William Hembell, Jun.

Treasurer.

John Vaughan, who is also *Librarian.*

PHILADELPHIA DISPENSARY.

Managers Elected, January 1815.

William White, President,
Lawrence Seckel,
Robert Blackwell,
Henry Helmuth,
Robert Smith,
Robert Ralston,
Godfrey Haga,
Ebenezer Hazard,
Isaac Snowden,
Joseph Crukshank,
Elliston Perot,
Samuel P. Griffitts, Secretary.

Officers Elected, January 1815.

Attending Physicians and Surgeons.

Doctor Joseph G. Shippen,
Joseph Woollens,
Aaron B. Tucker,
David Jones Davis,
Samuel Emlen, Jun.
Thomas Chandler.

Consulting Physicians and Surgeons.

Doctor Thomas Parke,
Caspar Wistar,
Philip S. Physick,
Thomas C. James.

Treasurer.

John Clifford.

Apothecary.

George G. Tresse.

VACCINE SOCIETY.

By the annual report of the managers made January 1815, it appears, that one thousand and fifty-three persons have been successfully vaccinated by the physicians of the institution in 1814; which, added to the patients of the preceding years, gives a total of six thousand five hundred and sixty-one.

HUMANE SOCIETY.

Philadelphia, March 8, 1815.

At a general meeting of the Members of the Humane Society of Philadelphia, held on the 1st inst. agreeably to their act of incorporation, and to public notice, the following persons were duly elected Managers for the present year, viz.

Joseph Crukshank,	Samuel Pancoast, Jun.
Charles Marshall,	William Leedom,
Benjamin Thaw,	Matthew L. Bevan,
Dr. Thomas C. James,	William Hembell, Jun.
Dr. Joseph Parrish,	Benjamin Jones, Jun.
Dr. John W. Moore,	Isaac Snowden.

At a meeting of the Managers, this day, the following Officers were chosen:

Joseph Crukshank, *President.*
Joseph P. Hornor, *Treasurer.*
Isaac Snowden, *Secretary.*

Inspectors of the Apparatus.

William Hembell, Jun.
William Leedom.

Committee of Correspondence.

Doctor Thomas C. James,
Joseph Parrish,
John W. Moore.

Abstract of the Bill of Mortality, for the town of Boston, from the 31st December, 1813, to the 1st January, 1815—agreeably to the Record kept at the Health Office.

January,	62	Under 1 year	163
February,	53	1 to 2	76
March,	65	2 to 5	53
April,	56	5 to 10	28
May,	44	10 to 20	35
June,	40	20 to 30	114
July,	63	30 to 40	87
August,	79	40 to 50	56
September,	51	50 to 60	33
October,	100	60 to 70	25
November,	66	70 to 80	35
December,	48	80 to 90	21
		90 to 100	1
Total,	727	Total,	727

The Deaths above were caused by Diseases and Casualties, as follows:—

Anasarca,	17	Hepatitis,	3
Apoplexy,	3	Hooping Cough,	5
Burns and Scalds,	5	Hydrocephalus Internus,	3
Casualty,	3	Hydrophobia,	1
Cholera Morbus,	2	Infantile Diseases,	208
Cholera,	1	Insanity,	2
Consumptions,	153	Jaundice,	2
Convulsions,	1	Mortification,	8
Cramp,	2	Neurosis,	1
Croup,	2	Old Age,	39
Cynanche Trachealis,	1	Paralysis,	9
Debility,	1	Phrenitis,	1
Disorders unknown,	13	Quinsy,	10
Drowned,	10	Scrofula,	1
Dysentery,	4	Spasm,	1
Fever Inflammatory,	3	Still Born,	32
Bilious,	6	Sudden,	14
Puerperal,	6	Suicide,	1
Pleurisy,	3	Teething,	1
Pulmonic,	26	Tetanus,	2
Typhus,	77	White Swelling,	1
Fits,	11		727
Gout,	2		

Published by order of the Board of Health,

NATHANIEL GREENOUGH, Sec'ry.

Boston, January 10, 1815.

Abstract of the Bill of Mortality for the City of Baltimore, from the first of January, 1814, to the first of January, 1815, agreeably to record, kept in the Office of the Commissioners of Health.

January,	101	Under 1 year	249
February,	82	From 1 to 2	115
March,	98	2 to 5	70
April,	110	5 to 10	41
May,	83	10 to 20	76
June,	62	20 to 30	179
July,	107	30 to 40	167
August,	92	40 to 50	115
September,	111	50 to 60	49
October,	125	60 to 70	29
November,	76	70 to 80	35
December,	105	80 to 90	25
		90 to 100	2
Total,	1152	Total,	1152

The Deaths above were caused by Diseases and Casualties, as follow:

Apoplexy,	6	Dysentery,	6
Cancer,	1	Fits,	80
Consumption,	225	King's Evil,	1
Croup,	25	Liver Inflammation,	7
Colic,	18	Locked Jaw,	1
Casualties,	15	Mortification,	3
Child Birth,	15	Murder,	2
Cholera Morbus,	102	Old Age,	69
Drowned,	12	Pleurisy,	110
Dropsy,	36	Palsy,	5
Fever Bilious,	113	Quinsy,	1
Typhus,	56	Rheumatism,	2
Scarlet,	1	Scurvy,	1
Inflammatory,	3	St. Anthony's Fire,	1
Nervous,	3	Suicide,	1
Gravel,	1	Still Born,	70
Hooping Cough,	21	Sudden,	5
Hives,	1	Teething,	4
Insanity,	2	Worms,	85
Inward Bleeding,	2	Unknown,	39
Jaundice,	1	Total,	1152

In the above bill, the deaths of the army are not included.

By order of the Board of Health,

SAMUEL VINCENT, Sec'ry.

Baltimore, January, 6, 1815.

Bill of Mortality in the City of New-York.

The City Inspector reports the death of one thousand nine hundred and seventy-four persons in the city of New-York, of various diseases from the 31st of December, 1813, to the 31st of December, 1814—of whom were:

Adults,	Men,	593	
	Women,	523	
			1116
Children,	Boys,	469	
	Girls,	389	
			858
			1974

Of whom 407 were of the age of one year and under—160 between 1 and 2—132 between 2 and 5—91 between 5 and 10—94 between 10 and 20—280 between 20 and 30—245 between 30 and 40—218 between 40 and 50—133 between 50 and 60—91 between 60 and 70—84 between 70 and 80—35 between 80 and 90—2 between 90 and 100—and 2 of 100 and upwards.—Total 1974. Of these 572 died of Consumption.

DIED.

At Auteuil near Paris in the month of August, 1814, of a nervous fever, BENJAMIN THOMPSON, Count Rumford, in the sixty-first year of his age.

In Philadelphia, in December 1814, Doctor SAMUEL DUFFIELD, aged eighty-two years.

In the month of January, 1815, Doctor ROBERT HARRIS, aged eighty-five years.

In Boston, in April, 1815, JOHN WARREN, M. D. aged sixty-four, President of the Massachusetts Medical Society, and Professor of Anatomy in Harvard University.

FOR THE ECLECTIC REPERTORY.

Statement of Deaths, with the diseases and ages, in the City and Liberties of Philadelphia, from the 1st of January 1814, to the 1st of January 1815.

DISEASES.	Under 1 year	From 1 to 2	From 2 to 5	From 5 to 10	From 10 to 20	From 20 to 30	From 30 to 40	From 40 to 50	From 50 to 60	From 60 to 70	From 70 to 80	From 80 to 90	From 90 to 100	From 100 to 110	Total
Aphtha	2	0	0	1	0	0	0	0	0	0	0	0	0	0	3
Abortion	3	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Asthma	0	0	0	0	0	0	1	2	0	0	2	0	0	0	5
Abscess	0	0	0	1	0	1	3	1	0	0	0	0	0	0	6
Aneurism	0	0	0	0	0	0	1	1	2	0	0	0	0	0	4
Apoplexy	0	0	0	0	0	1	5	7	5	3	3	1	0	0	25
Atrophy	7	3	2	1	2	2	8	0	6	4	0	0	0	0	35
Burns	3	2	3	1	1	1	0	0	0	1	0	0	0	0	12
Cancer	0	0	0	0	0	1	5	3	6	1	3	0	0	0	19
Casualties	1	0	0	1	2	1	3	1	3	1	1	0	0	0	14
Catarrh	9	1	1	0	0	2	3	0	1	0	2	0	0	0	19
Child Bed	0	0	0	0	1*	3	1	1	0	0	0	0	0	0	6
Cholera Morbus	65	37	20	1	2	0	0	2	0	0	0	0	0	0	127
Colic	0	0	1	0	0	1	1	1	1	0	0	0	0	0	5
Consumption of the Lungs	11	6	6	7	21	54	77	46	28	10	7	1	0	0	274
Convulsions	141	11	7	3	0	1	7	1	1	1	1	0	0	0	174
Caries	0	0	0	1	0	0	1	0	0	0	0	0	0	0	2
Cachexy	0	0	0	1	0	0	1	1	1	0	0	1	0	0	5
Decay	6	5	2	1	4	7	5	5	3	1	4	3	0	0	46
Diarrhœa	0	4	1	0	0	1	1	3	3	5	6	1	0	0	25
Dropsy	0	0	2	2	1	5	8	5	2	6	3	1	0	0	35
of the Breast	0	1	0	0	0	3	6	8	2	5	4	0	0	0	29
in the Brain	15	8	10	6	0	1	0	0	0	0	0	0	0	0	40
Drowned	1	0	1	1	2	1	8	3	3	0	1	0	0	0	21
Dysentery	12	11	7	4	4	3	6	5	5	4	3	2	0	0	66
Drunkenness	0	0	0	0	0	1	2	1	1	0	0	0	0	0	5
Disease in Knee Joint	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Debility	12	1	2	0	0	1	4	3	5	8	7	4	1	0	48
Epilepsy	1	0	1	0	1	1	1	1	1	0	0	0	0	0	7
Erysipelas	2	0	1	0	1	0	0	0	0	0	0	0	0	0	4
Fracture	0	0	0	0	2	0	0	0	0	0	0	1	1	0	4
Fever	3	2	5	2	2	1	1	2	2	4	1	0	0	0	25
Intermittent	0	1	1	0	0	1	1	1	0	0	0	0	0	0	5
Remittent	0	1	0	1	0	3	0	1	3	3	0	0	0	0	12
Bilious	0	0	0	1	0	0	1	2	0	0	0	0	0	0	4
Nervous	1	1	0	0	4	3	2	1	0	1	0	0	0	0	13
Malignant	1	0	1	0	2	0	0	1	2	0	0	0	0	0	7
Typhus	2	2	1	1	9	13	25	18	11	7	4	0	1	0	94
Puerperal	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Hectic	0	0	1	0	0	4	0	0	0	0	0	0	0	0	5
Inflammatory	0	1	1	0	0	3	0	0	1	0	0	0	0	0	6
Mortification and Gangrene	4	0	2	0	1	3	2	0	1	3	0	1	0	0	17
Gout	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2
Gravel	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2
Carried over,	302	98	79	37	62	124	190	127	99	71	53	17	3	0	1262

* Sixteen years of age.

	Under 1 year	From 1 to 2	From 2 to 5	From 5 to 10	From 10 to 20	From 20 to 30	From 30 to 40	From 40 to 50	From 50 to 60	From 60 to 70	From 70 to 80	From 80 to 90	From 90 to 100	From 100 to 110	Total
Brought forward,	302	98	79	37	62	124	190	127	99	71	53	17	3	0	1262
Gun-shot Wound	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Hooping Cough	7	6	8	2	0	0	0	0	0	0	0	0	0	0	23
Hives	14	2	5	0	0	0	0	0	0	1	0	0	0	0	22
Hernia	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2
Hæmorrhage	0	0	0	1	0	0	4	1	2	1	0	0	1	0	10
Hydrophobia	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Inflammation of the Brain	1	0	1	1	1	1	3	2	0	1	0	0	0	0	11
of the Lungs	1	2	1	0	0	0	1	1	0	0	0	0	0	0	6
of the Stomach	7	3	1	0	0	0	2	2	1	3	1	0	0	0	20
of the Bowels	12	2	1	2	0	2	0	2	2	1	0	0	0	0	24
of the Liver	5	1	1	0	0	1	7	2	3	3	0	1	0	0	24
Insanity	0	0	0	0	0	2	8	7	3	2	0	0	0	0	22
Jaundice	1	0	0	0	0	1	0	0	0	0	0	0	0	0	2
Locked Jaw	1	0	0	0	0	0	0	1	0	0	0	0	0	0	2
Measles	5	2	0	1	0	1	0	0	0	0	0	0	0	0	9
Old Age	0	0	0	0	0	0	0	1	0	7	13	22	14	2	59
Pleurisy	14	1	2	2	2	9	6	14	2	8	4	1	0	0	65
Palsy	0	0	0	0	0	1	1	2	2	5	6	1	0	0	18
Rheumatism	1	0	0	0	1	1	1	1	0	2	1	0	0	0	8
Scrofula	1	0	1	1	4	1	2	2	1	0	0	0	0	0	13
Sore Throat	7	1	1	1	0	1	1	0	0	0	0	0	0	0	12
Still Born	96	0	0	0	0	0	0	0	0	0	0	0	0	0	96
Suicide	0	0	0	0	1	0	2	1	1	0	0	0	0	0	5
Sudden	4	0	1	0	0	3	6	4	3	1	0	0	0	0	22
Syphilis	0	0	0	0	0	2	0	2	0	0	0	0	0	0	4
Strangury	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Teething	4	3	1	2	0	0	0	0	0	0	0	0	0	0	10
Ulcers	0	0	0	1	1	1	2	0	1	0	0	0	0	0	6
Wounds	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Worms	1	1	1	1	0	0	0	0	0	0	0	0	0	0	4
Unknown	2	0	0	0	0	1	2	2	1	0	0	0	0	0	8
Total,	486	122	104	53	72	154	239	175	122	106	78	42	18	2	1773

NOTE. Of the above there were 540 males of twenty years and upwards, 373 under twenty years: of females, 425 of twenty years and upwards, 289 under twenty years, and 156 children, principally under one year, whose sex is unknown. To the above may be added, 354 which were not received at this office from the Public Burial Ground, making a grand Total 2137.

Deaths in each month of the above period.

	Adults.	Children.	*Total.*
January	49	49	98
February	61	41	102
March	79	48	127
April	101	80	181
May	57	69	126
June	71	65	136
July	67	104	171
August	122	160	282
September	73	62	135
October	85	47	132
November	87	70	157
December	86	50	136
Total	938	845	1773

By order of the Board of Health,

JOHN ALLISON, Clerk.

Health Office, February 21*st*, 1815.

RECENT BRITISH PUBLICATIONS.

The Edinburgh Medical and Surgical Journal, exhibiting a Concise View of the latest and most important Discoveries in Medicine, Surgery and Pharmacy. (Published Quarterly). No. XL. which completes volume X.

Letters to the Duke of Kent, on the Efficacy of Equable and Artificial Temperature, in the treatment of Consumption. By Thomas Sutton, M. D.

An Index to the Anatomical, Medical, Chirurgical, and Physiological Papers, contained in the Philosophical Transactions of the Royal Society of London, from 1665 to 1813; chronologically and alphabetically arranged, with brief explanatory remarks. Quarto.

A Practical Account of the Fever commonly called Bilious Remittent, as it appeared in the Ships and Hospitals of the Mediterranean Fleet, with Cases and Dissections. By William Burnett, M. D. Physician to the Fleet. Octavo.

Lectures on Inflammation, exhibiting a view of the general Doctrines, Pathological and Practical, of Medical Surgery. By John Thompson, M. D. F. R. S. E.

An Essay on Bronchitis, or Inflammation of the Secreting Membrane of the Lungs; second edition, much enlarged. By Charles Badham, M. D.

Observations on the distinguishing Symptoms of three different Species of Pulmonary Consumption: with Remarks on the Remedies and Regimen, best fitted for the prevention, removal, or alleviation of each species. By Andrew Duncan, Sen. M. D.

An Account of a successful Method of treating Diseases of the Spine, with Observations and Cases in illustration. By Thomas Baynton.

View of the Progress and Present State of Animal Chemistry. By I. J. Berzelius, M. D. Octavo.

Essay on the Theory of the Earth. By M. Cuvier. Translated from the French, by R. Kerr, F. R. S., with Mineralogical Notes. By Professor Jameson. Octavo.

Essay on Light and Vision. By John Bywater.

Essay on Electricity. By the same.

Flora Americæ Septentrionalis: or a Systematic Arrangement and Description of the Plants of North America; containing, besides what have been described by preceding authors, many new and rare Species, collected during twelve years travels and residence in that country. By Frederick Pursh. Two volumes, octavo, with coloured plates.

RECENT AMERICAN PUBLICATIONS.

A Complete Treatise on the Symptoms, Effects, Nature, and Treatment of Syphilis. By F. Swediaur, M D. Translated from the fourth French edition, by Thomas T. Hewson, one of the Surgeons of the Alms-House. Thomas Dobson, Philadelphia.

Abernethy's Surgical Observations on Tumours, and on Lumbar Abscesses. This completes the American edition of Abernethy's Surgical Observations, in which the four volumes are comprised in two. Octavo. Thomas Dobson, Philadelphia.

A Dissertation on the Pathology of the Human Fluids. Octavo. Van Winkle and Wiley, New-York.

An edition of Benjamin Bell's Work, on the Venereal, with Notes. Octavo. E. F. Backus, Albany.

Dr. Hosack, Professor of the Theory and Practice of Physic, in the University of New-York, has recently published, "Observations on the Laws governing the Communication of Contagious Diseases, and the means of arresting their Progress." This memoir was originally read before the American Philosophical Society, held at Philadelphia; but is now published under the auspices of the Literary and Philosophical Society of New-York: considerably extended and improved by the addition of some interesting Notes. Not having received the work until this number had nearly passed through the press, we are obliged to defer a fuller account of it until the publication of our next.

PROPOSED AMERICAN PUBLICATION.

In the course of the ensuing summer will be published: Flora Philadelphiensis: sive Enumeratio plantarum absque omni cultura crescentium, in circuitu decem milliarium in territorio Philadelphiensi; additis descriptionibus, synonimicis, ac denominationibus cujuscunque earundem Anglico idiomate exhibitis; quæ enumeratio in ordinem est redacta secundum Linnæi Systema Sexuale: auctore Gulielmo P. C. Barton, Medicinæ Doctore.

J. G. Exilious, engraver, Philadelphia, should he receive sufficient encouragement, proposes to publish by subscription, a Series of Engravings, tending to illustrate the Generation and Parturition of the Human Species. The engravings to be selected (under the direction of the Professor of Midwifery in the University of Pennsylvania) from the Plates of Smellie, Hunter, Denman, Soemmering, and Baillie. To be published by Thomas Dobson, Philad.

THOMAS DOBSON HAS IN THE PRESS,

A Dissertation on the Influence of Change of Climate in curing Diseases; by Professor Gregory, of Edinburgh. Translated from the original Latin, and enlarged with occasional Notes. By William P. C. Barton, M. D.

Professor Cooper's Work on the Practice of Dyeing. Octavo.